

**Wyoming Department of Health
Summary of Foodborne and Waterborne Diseases
2008 Annual Report**

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Executive Summary

The Wyoming Department of Health Foodborne and Waterborne Disease Surveillance System is a collaborative effort between personnel in Wyoming Department of Health Infectious Disease Epidemiology Program, local health departments, other state agencies, clinical laboratories, and healthcare providers in Wyoming and elsewhere. These groups work together to identify, investigate, and mitigate the effects of foodborne and waterborne diseases in the State of Wyoming.

Data presented in this report were collected by the Wyoming Department of Health Infectious Disease Epidemiology Program through the Reportable Diseases and Conditions surveillance system and through public health case follow-up. The Foodborne and Waterborne Disease Surveillance database contains information on certain reportable foodborne and waterbone diseases and the public health investigations carried out on these disease occurrences. This database contains information regarding the etiology, patient demographics, geographic location, clinical laboratory results, exposure histories, and public health control measures on each reported occurrence. Data were analyzed by state-level epidemiologists and other staff, and additional retrospective case review was performed to verify actual case counts.

This report provides an overview of descriptive epidemiology of certain reportable foodborne and waterborne diseases and conditions from January 1, 2008 to December 31, 2008.

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Methods

Definitions

- Crude incidence rate - Incidence is defined as the number of *new* cases diagnosed during a set time period in a defined population. Incidence is not a representation of risk. Therefore, a crude incidence rate is the number of new cases of a disease within the specified population. A crude incidence rate has not been adjusted for age or other confounding variables. All crude incidence rates in this document are reported as the number of cases per 100,000 population.
- Age-adjusted incidence rate – Statewide age-adjusted rates reported in this document were standardized against the 2000 U.S population using specified age groups and are reported as the number of cases per 100,000 population. County age-adjusted rates reported in this document were standardized against the median population in Wyoming from 2003-2007 (2008 census data was not available at the time of this report) for the specific age group and are also reported as the number of cases per 100,000 population. Age-adjustment allows rates to be compared over time and allows rates from one geographic area (i.e., county) to be compared with rates from another geographic area that may have differences in age distributions. Any observed differences in age-adjusted incidence rates are not due to differing age structures.
- Age-specific incidence rate - An age-specific rate is the rate of disease found within a certain age group. Age-specific incidence rates were calculated using specified age groups and total population (both sexes combined). They are reported per 100,000 population.
- Standardized incidence ratio –The standardized incidence ratio (SIR) is a summary ratio that allows a comparison of incidence rates from a defined population to a standard population. When comparing statewide incidence rates, the 2000 US standard population was used to calculate the SIR. When comparing county incidence rates, the Wyoming standard population (median population from 2003-2007, as 2008 census data was not available) was used to calculate the SIR. It was not possible to calculate the state-level SIR for those diseases that are not nationally reportable due to lack of national summary data. A ratio of 1.00 indicates that the observed number of cases equals the expected number of cases. A ratio above 1.00 indicates that there were more cases observed than expected. Thus, a ratio of 1.25 means that there were 25 percent more observed cases than expected. A ratio below 1.00 indicates that there were fewer observed cases than expected. Therefore, a ratio of 0.85 is interpreted as 15 percent fewer observed cases occurring than expected. The confidence interval of a standardized incidence ratio is interpreted as follows:
 - If the lower number in the confidence interval is less than or equal to 1.00 and the upper number in the interval is greater than or equal to 1.00, there is no statistically significant difference between the number of observed cases and the number of expected cases.
 - If the lower number in the confidence interval is above 1.00, there is a 95 percent probability that a significantly higher number of cases were observed than expected.
 - If the upper number in the confidence interval is less than 1.00, there is a 95 percent probability that significantly fewer cases were observed than expected.

Amoebiasis (*Entamoeba histolytica*)

Case definition

- Confirmed
 - Intestinal amoebiasis:
 - Demonstration of *E. histolytica* cysts or trophozoites in stool, OR
 - Demonstration of trophozoites of *E. histolytica* in tissue biopsy or ulcer scrapings by histopathology or culture
 - Extraintestinal amoebiasis:
 - Demonstration of trophozoites of *E. histolytica* in extraintestinal tissue, OR
 - Presence of specific antibody against *E. histolytica* as measured by indirect hemagglutination (IHA) or other reliable immunodiagnostic test such as enzyme linked immunosorbent assay (ELISA), in a symptomatic person with clinical and/or radiological findings consistent with extraintestinal infection. A positive serologic test in an asymptomatic person does not necessarily indicate extraintestinal amoebiasis
- Probable[†]
 - Patient with epidemiologic link to a confirmed case and clinically compatible illness

[†]The US Centers for Disease Control and Prevention (CDC) does not define or utilize a definition for “probable” case status. The probable case definition is used by the Wyoming Department of Health solely for surveillance purposes.

Summary

In 2008, four cases of amoebiasis were reported to the WDH Infectious Disease Epidemiology Program (0.79 cases per 100,000 per year). Of those, three were confirmed and one was probable. In 2008, Wyoming’s incidence rate for amoebiasis is statically equivalent to the US incidence rate (SIR: 1.20, 95%CI: 0.02-2.37). The median age of cases of amoebiasis is 19 years (range: 0-38 years). Persons aged 0-4 years had the highest crude, age-specific incidence rate (2.99 cases per 100,000 per year). However, the ages of two cases (33.3%) were not collected/reported. An equal number of male and female cases were reported. Public health officials were not able to identify a likely source for the cases. All four cases were associated with one household cluster in Uinta County, and all four reported history of out-of-state travel during their exposure periods. One child case was diagnosed with amoebic liver abscesses and was subsequently hospitalized. In 2008, Uinta County was the only county to report cases of amoebiasis with an age-adjusted incidence rate of 10.98 cases per 100,000 per year, which is not statistically different than the expected state rate for amoebiasis (SIR: 12.47, 95%CI: 0.25-24.70).

Table 1: Incidence of Amoebiasis by Month and by Status, Wyoming, 2008.

Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	0	0	0	0	0	0	0	0	0	1	2	0	3
Probable	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	0	0	0	0	0	0	0	0	0	1	3	0	4

Figure 1: Incidence of Amoebiasis by Month, Wyoming, 2008 and Previous 5-Year Mean

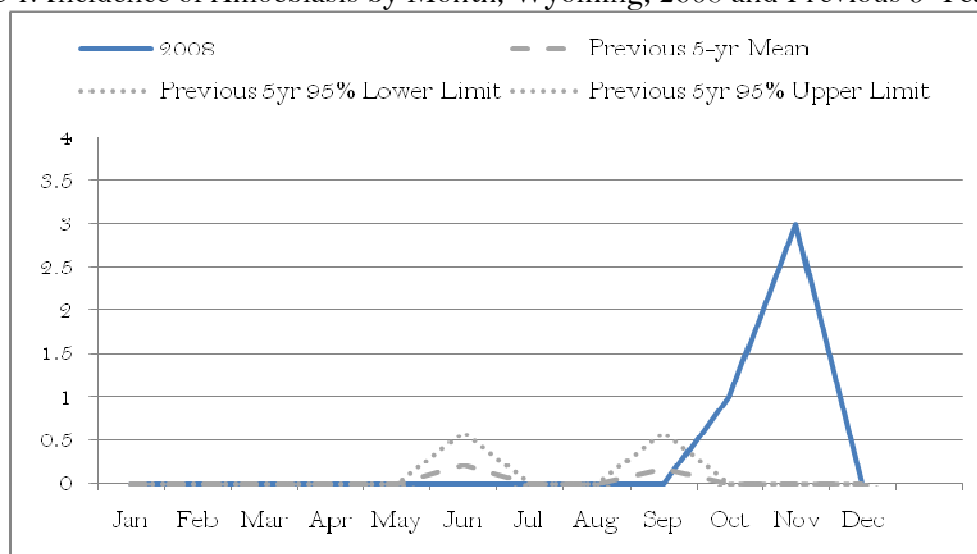


Table 2: Demographics of Case Patients with Amoebiasis (N=4), Wyoming, 2008

	n(%)		n(%)	
Age				
0-4 years	1 (25.0%)	Hospitalized		
5-14 years	0 (0.0%)	Yes	1 (25.0%)	
15-24 years	0 (0.0%)	No	3 (75.0%)	
25-39 years	1 (25.0%)	Unknown	0 (0.0%)	
40-64 years	0 (0.0%)			
≥65 years	0 (0.0%)	Outbreak status		
Unknown	2 (50.0%)	Cluster Related	4 (100.0%)	
Gender		Outbreak related	0 (0.0%)	
Female	2 (50.0%)			
Male	2 (50.0%)			

Outbreaks of Amoebiasis, Wyoming, 2008

Household Cluster of Amoebiasis, Uinta County, 2008

In November 2008, Uinta County Public Health notified the WDH Infectious Disease Epidemiology Program of two confirmed cases and one probable case of amoebiasis in one Uinta County family. The index case was an infant who had tested positive for the parasite at a Utah hospital. The infant underwent surgery to remove parasite-related liver and lung abscesses. The attending pediatrician identified that two other children in the household were symptomatic with an illness consistent with amoebiasis and both of those children were subsequently tested. One sibling was positive for *E. histolytica* and the other was negative. The WDH Infectious Disease Epidemiology Program and Uinta County Public Health conducted follow-up with the family. Although the parents denied symptoms, both were tested in accordance with public health guidelines. *E. histolytica* was subsequently identified in the mother's stool sample as well. In total, four out of six of the family members were considered cases. A source of the infection was not identified.

Botulism (*Clostridium botulinum*)

Case definition

- Foodborne
 - Confirmed - a clinically compatible case that is laboratory confirmed or that occurs among persons who ate the same food as persons who have laboratory-confirmed botulism. Lab-confirmation must include at least one of the following criteria:
 - Detection of botulinum toxin in serum, stool, or patient's food, or
 - Isolation of *Clostridium botulinum* from stool
 - Probable - a clinically compatible case with an epidemiologic link (e.g., ingestion of a home-canned food within the previous 48 hours)
- Infant
 - Confirmed - a clinically compatible case that is laboratory-confirmed, occurring in a child aged less than 1 year. Lab-confirmation must include at least one of the following criteria:
 - Detection of botulinum toxin in stool or serum, or
 - Isolation of *Clostridium botulinum* from stool
- Wound
 - Confirmed - a clinically compatible case that is laboratory confirmed in a patient who has no suspected exposure to contaminated food and who has a history of a fresh, contaminated wound during the 2 weeks before onset of symptoms. Lab-confirmation must include at least one of the following criteria:
 - Detection of botulinum toxin in serum, or
 - Isolation of *Clostridium botulinum* from wound
- Other
 - Confirmed – a clinically compatible case that is laboratory confirmed in a patient aged greater than or equal to 1 year who has no history of ingestion of suspect food and has no wounds. Lab-confirmation must include at least one of the following criteria:
 - Detection of botulinum toxin in clinical specimen, or
 - Isolation of *Clostridium botulinum* from clinical specimen

Summary

In 2008, one case of infant botulism were reported to the WDH Infectious Disease Epidemiology Program (0.22 cases per 100,000 per year). The incidence of botulism in Wyoming was equivalent to the US national incidence, which is 0.0 cases per 100,000 per year (SIR: incalculable). Annually, zero cases of botulism are expected in Wyoming. Persons aged 0-4 years had the highest crude, age-specific incidence rate (2.84 cases per 100,000 per year). Laramie County was the only Wyoming county to report a case of botulism in 2008. The age-adjusted incidence rate of botulism in Laramie County in 2008 was 0.20 cases per 100,000 per year, which was not statistically different from the expected state rate (SIR: 1.05, 95%CI: -1.15-3.55). Public health officials were not able to identify a definitive source for the case.

Campylobacteriosis

Case definition

- Confirmed – a case that is laboratory confirmed by isolation of *Campylobacter* bacteria from any clinical specimen
- Probable – a clinically compatible case that is epidemiologically-linked to a laboratory-confirmed case

**This condition is not nationally notifiable.*

Summary

In 2008, 55 cases of campylobacteriosis were reported to the WDH Infectious Disease Epidemiology Program (11.69 cases per 100,000 per year). Of the cases reported, 43 (78.2%) were laboratory-confirmed and 12 (21.6%) were probable cases (epidemiologically-linked to a confirmed case). The incidence of campylobacteriosis in Wyoming was statistically equivalent to the estimated US incidence (12.7 cases per 100,000 per year) based on CDC FoodNet sites (SIR: 1.05, 95%CI: 0.68-1.16). The median age of cases of campylobacteriosis was 31 years (range: 0-79 years). Persons aged 0-4 years had the highest age-specific incidence rate (22.69 cases per 100,000 per year). Cases were more likely to be male (56.4%) than female (43.6%). While a definitive source of the infection could not be determined in nearly 30% of all cases, contact with animals, especially cattle, and consumption of unpasteurized milk or unpasteurized milk products continue to be frequent sources of *Campylobacter* infection in Wyoming.

Fifteen Wyoming counties reported cases of campylobacteriosis in 2008. Weston County reported the highest age-adjusted incidence rate (132.28 cases per 100,000 per year), which was nearly eleven times greater than the expected statewide incidence rate (11.69 cases per 100,000 per year). In addition to Weston County, Goshen County (56.40 cases per 100,000 per year) also had an age-adjusted incidence rate that were statistically greater than the statewide incidence rate. Albany (3.07 cases per 100,000 per year), Laramie (0.87 cases per 100,000 per year), Natrona (1.87 cases per 100,000 per year) and Sheridan (2.47 cases per 100,000 per year) Counties reported cases and had age-adjusted incidence rates statistically lower than the expected state rate. Carbon, Converse, Hot Springs, Johnson, Niobrara, Sublette, Uinta and Washakie Counties did not report any cases of campylobacteriosis in 2008. All other counties had age-adjusted incidence rates that were statistically equivalent to the statewide incidence rate.

Table 3: Occurrence of Campylobacteriosis by Month Reported and by Status, Wyoming, 2008

Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	2	2	0	6	4	3	9	6	3	5	3	0	43
Probable	0	1	0	0	0	1	3	2	1	1	0	3	12

Figure 2: Occurrence of Campylobacteriosis by Month, Wyoming, 2008

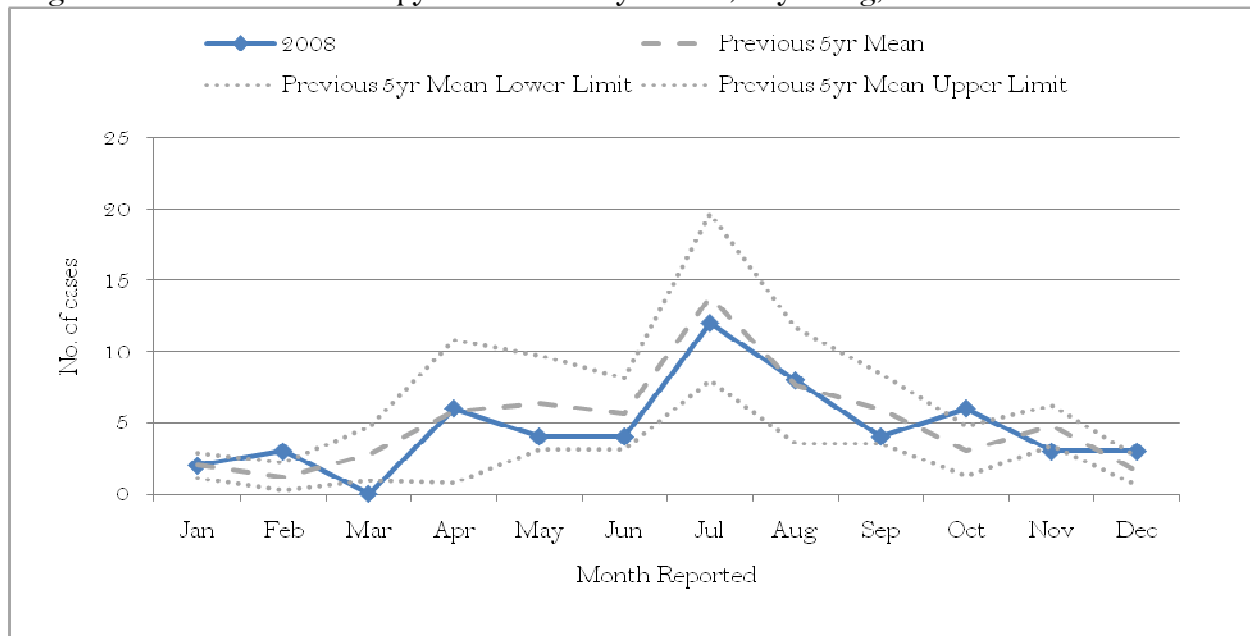
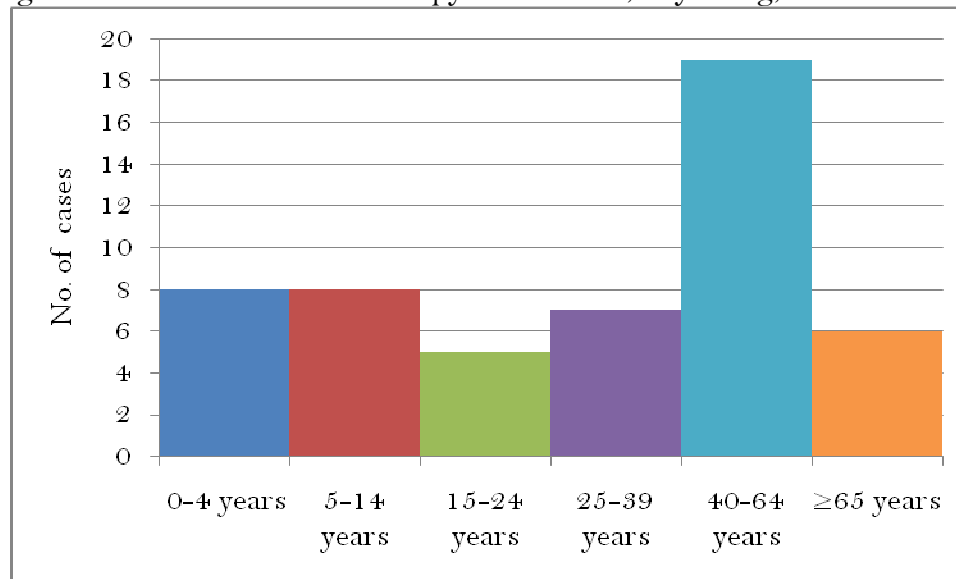


Table 4: Demographics of Case Patients with Campylobacteriosis, Wyoming, 2008

	n(%)
Age	
0-4 years	8 (14.5%)
5-14 years	8 (14.5%)
15-24 years	5 (9.1%)
25-39 years	7 (12.7%)
40-64 years	19 (34.5%)
≥65 years	6 (10.9%)
Unknown	2 (3.6%)
Median age	31 years
Age range	0-79 years
Gender	
Female	24 (43.6%)
Male	31 (56.4%)
Hospitalized	
Yes	10 (18.2%)
No	42 (76.4%)
Unknown	3 (5.5%)
Median no. of days hospitalized	2 days
Range of no. of days hospitalized	1-4 days
Outbreak status	
Cluster Related	0 (0.0%)
Outbreak related	5 (9.1%)

Figure 3: Age Distribution of Cases of Campylobacteriosis, Wyoming, 2008



* Two cases in 2008 had an unknown age.

Table 5: Crude and Age-adjusted Incidence Rates of Campylobacteriosis, Wyoming, 2008

	Total No. of Cases	Crude incidence rate (per 100,000 per year)	Age-adjusted incidence rate (per 100,000 per year)	SIR* (95%CI)
Albany	1	3.05	3.07	0.25 (-0.24-0.75)§
Big Horn	3	26.50	22.92	1.89 (-0.25-4.03)
Campbell	6	14.47	17.29	1.43 (0.29-2.57)
Carbon	0	0.00	0.00	—
Converse	0	0.00	0.00	—
Crook	1	15.49	21.35	1.76 (-1.69-5.21)
Fremont	5	13.12	10.90	0.90 (0.11-1.69)
Goshen	7	57.99	56.40	4.65 (1.21-8.10)§
Hot Springs	0	0.00	0.00	—
Johnson	0	0.00	0.00	—
Laramie	1	1.14	0.87	0.07 (-0.07-0.21)§
Lincoln	7	42.09	45.94	3.79 (0.98-6.60)
Natrona	1	1.37	1.87	0.15 (-0.15-0.46)§
Niobrara	0	0.00	0.00	—
Park	4	14.51	16.67	1.38 (0.03-2.72)
Platte	3	36.17	53.99	4.45 (-0.59-9.50)
Sheridan	1	3.49	2.47	0.20 (-0.20-0.60)§
Sublette	0	0.00	0.00	—
Sweetwater	2	5.01	5.44	0.45 (-0.17-1.07)
Teton	5	22.71	27.30	2.25 (0.28-4.23)
Uinta	0	0.00	0.00	—
Washakie	0	0.00	0.00	—
Weston	7	99.69	132.28	10.91 (2.83-19.00)§
Total	55	12.12	11.69	1.05 (-1.15-3.55)*†

*Wyoming state population used as “standard” population when calculating age-adjusted estimates for each county.

† SIR calculated using estimated national incidence rate of 12.70 cases per 100,000 per year.

§ Estimate is statistically different than the expected incidence rate. Estimates of greater than 1.00 indicate incidence is greater than what is expected and estimates less than 1.00 indicate incidence is less than what is expected and that these differences cannot be explained by differences in the age distribution of the population.

Table 6: Clinical Characteristics among Cases of Campylobacteriosis, Wyoming, 2008

	Total, (%)
Had gastrointestinal symptoms	
Yes	51 (92.7%)
No	0 (0.0%)
Unknown	4 (7.3%)
Specimen source	
Stool	42 (76.4%)
Blood	1 (1.8%)
Unspecified	12 (21.8%)
Bacterial isolate was confirmed at WPHL*	
Yes	25 (45.5%)
No	30 (54.5%)
Species of Campylobacter (N=28)	
<i>C. jejuni</i>	26 (92.9%)
<i>C. coli</i>	2 (7.1%)
<i>C. upsaliensis</i>	0 (0.0%)
Untypeable	0 (0.0%)
Received antibiotic	
Yes	28 (50.9%)
No	19 (34.6%)
Unknown	8 (14.5%)

* Wyoming state statute requires clinical laboratories to send confirmed Campylobacter isolates to the Wyoming Public Health Laboratory for confirmation, subtyping and pulsed-field gel electrophoresis analysis.

Table 7: Most Likely Source of Infection among Cases of Campylobacteriosis, Wyoming, 2008.

	Total, (%)
Animal source	25 (45.4%)
Source not evident	17 (30.9%)
Food source at home	6 (10.9%)
Foreign travel	3 (5.5%)
Drinking water	1 (1.8%)
Unpasteurized milk/milk-products	1 (1.8%)
Recreational water	1 (1.8%)
Food source at restaurant or other food venue	1 (1.8%)

Likely exposures are determined by making a “best guess” by trained epidemiologists based on the case patient’s exposure history and should not be viewed as a definitive source of infection.

Table 8: Frequency of Certain Animal Exposures Reported by Cases of Campylobacteriosis, Wyoming, 2008.

	Total
Contact with dog	29 (52.7%)
Contact with cattle	14 (25.5%)
Contact with cat	7 (12.7%)
Contact with pig	6 (10.9%)
Contact with horse	5 (9.1%)
Contact with bird	5 (9.1%)
Contact with sheep	2 (3.6%)
Contact with rodent	2 (3.4%)
Contact with goat	1 (1.8%)
Contact with reptile	0 (0.0%)
Contact with amphibian	0 (0.0%)

Percentages can add up to more than 100% because case patients can report exposure to more than one of these types of animals.

Table 9: Frequency of Other Exposures among Cases of Campylobacteriosis, Wyoming, 2008.

	Total
Ate at any restaurant	34 (61.8%)
Ate at any fast food restaurant	19 (35.2%)
Consumed water from a private well	10 (18.2%)
Swam in treated water venue	9 (14.5%)
Swam in untreated water venue	6 (10.9%)
Attended daycare	0 (0.0%)
Live with daycare attendee	0 (0.0%)
Out of state travel	15 (27.3%)
International travel	5 (9.1%)

Percentages can add up to more than 100% because case patients can report more than one of these exposures.

Table 10: Frequency of Reported High-Risk Occupations among Cases of Campylobacteriosis, Wyoming, 2008.

	Total
Food-handling employee	2 (3.6%)
Healthcare worker with direct patient contact	0 (0.0%)
Daycare worker	0 (0.0%)

Public health guidelines call for the exclusion of these individuals from their high-risk occupational setting until 48 hours has passed since the last bout of diarrhea or vomiting, whichever occurs last.

Outbreaks of Campylobacteriosis, 2008

Outbreak of Campylobacter jejuni in Extended Family, Goshen County, 2008

In November 2008, the WDH Infectious Disease Epidemiology Program was notified of two laboratory-confirmed cases of campylobacteriosis among family members from Goshen County. Routine public health follow-up revealed that three other members of the extended family were also ill with symptoms consistent with campylobacteriosis. Two separate households were affected, and family members report frequent visitation between the two households. Of the five cases, two were children and three were adults. No one was hospitalized. PFGE analysis of the *Campylobacter* isolates from the two laboratory-confirmed cases showed identical genetic

relatedness among the infections. The investigation did not reveal other cases; ill persons were limited to the one extended family. A source of the infection was not identified. The last case to develop illness onset was suspected of being a secondary case who developed illness after caring for other ill family members. One ill family member was found to be a foodhandler at a local restaurant and was subsequently excluded from work until she was asymptomatic, a routine measure to protect the public's health.

Cryptosporidiosis

Case definition

- Confirmed – a case that has clinically compatible illness and is laboratory confirmed by one of the following methods:
 - Organisms identified in stool, intestinal fluid, or tissue samples or biopsy specimens
 - Antigens in stool or intestinal fluid, or
 - Nucleic acid by PCR in stool, intestinal fluid, or tissue samples or biopsy specimens
- Probable – a clinically compatible case that is epidemiologically-linked to a laboratory-confirmed case

Summary

In 2008, 25 cases of cryptosporidiosis were reported to the WDH Infectious Disease Epidemiology Program (5.51 cases per 100,000 per year). Of the cases reported, 22 (88.0%) were laboratory-confirmed and 3 (12.0%) were probable cases (epidemiologically-linked to a confirmed case). The incidence of cryptosporidiosis in Wyoming in 2008 was statistically equivalent to the estimated US incidence (3.7 cases per 100,000 per year) based on CDC National Notifiable Disease Surveillance System (SIR: 1.40, 95%CI: 0.85-1.95). The median age of cases of cryptosporidiosis was 25 years (range: 0-81 years). Persons aged 0-4 years had the highest age-specific incidence rate (14.18 cases per 100,000 per year). Cases were more likely to be male (60.0%) than female (40.0%). A suspected source of infection could not be identified in 48.0% of cases. Recreational water exposure (16.0%) and animal contact (12.0%) are common sources of exposure.

Albany, Big Horn, Carbon, Converse, Crook, Fremont, Goshen, Laramie, Natrona, Niobrara, Park, Platte, Sheridan, Sweetwater, and Teton Counties did not report any cases of cryptosporidiosis in 2008. Hot Springs County had the highest age-adjusted incidence rate (72.29 cases per 100,000 per year); however this incidence rate was not statistically different from the state's expected rate. Campbell County's age-adjusted incidence rate of 31.65 cases per 100,000 per year was statistically greater than the expected state rate. Johnson, Lincoln, Sublette, Washakie, and Weston Counties also reported cases of cryptosporidiosis in 2008; the age-adjusted incidence rates in those counties were statistically equivalent to the expected state rate.

Table 11: Occurrence of Cryptosporidiosis by Month Reported and by Status, Wyoming, 2008

Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	0	0	4	2	1	2	3	2	2	6	0	0	22
Probable	0	0	0	0	0	1	0	0	2	0	0	0	3

Figure 4: Incidence of Cryptosporidiosis by Month Reported, Wyoming, 2008

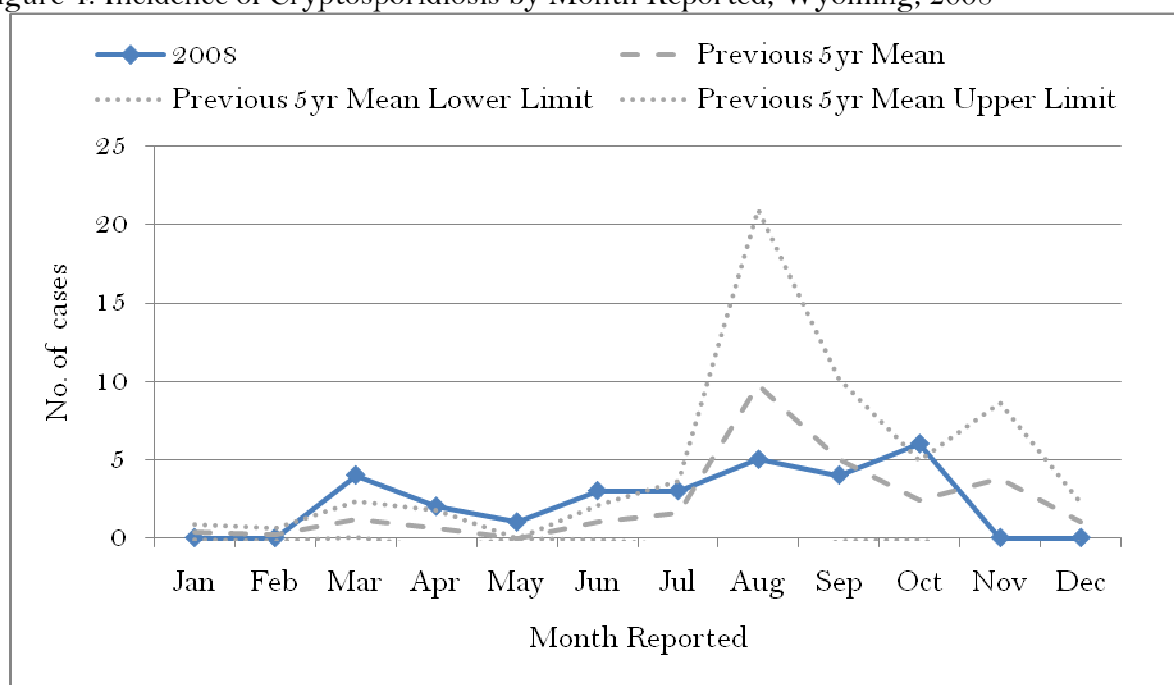
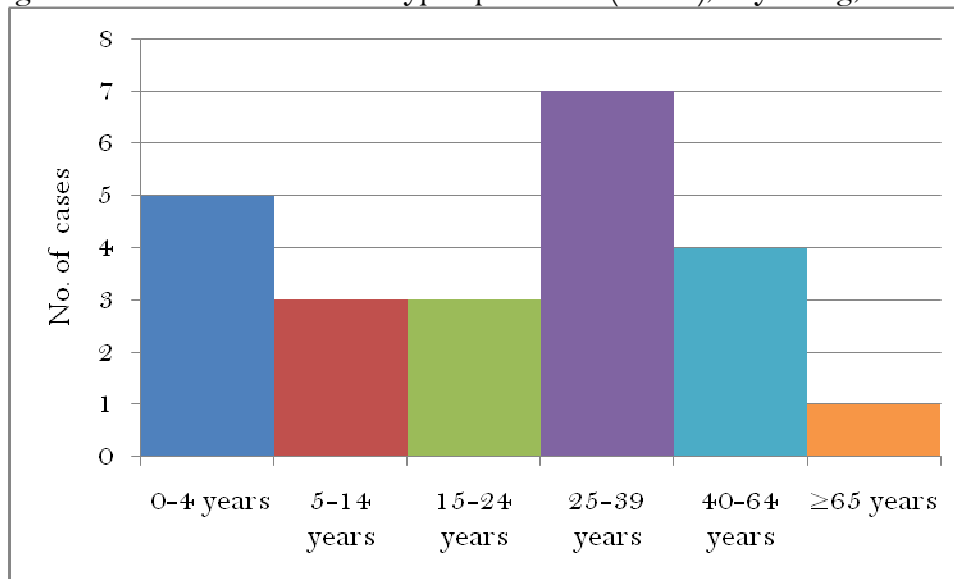


Table 12: Demographics of Case Patients with Cryptosporidiosis (N=25), Wyoming, 2008

		Total n(%)
Age		
0-4 years		5 (20.0%)
5-14 years		3 (12.0%)
15-24 years		3 (12.0%)
25-39 years		7 (28.0%)
40-64 years		4 (16.0%)
≥65 years		8 (4.9%)
Unknown		6 (3.7%)
Median age		25 years
Age range:		0-81 yrs
Gender		
Female		10 (40.0%)
Male		15 (60.0%)
Hospitalized		
Yes		1 (4.0%)
No		24 (96.0%)
Unknown		7 (4.3%)
Median no. of days hospitalized		Unk
Range of no. of days hospitalized		Unk
Outbreak status		
Outbreak/ cluster related		3 (12.0%)

Figure 5: Age Distribution of Cases of Cryptosporidiosis (N=25), Wyoming, 2008



* Two cases had an unknown age in 2008.

Table 13: Crude and Age-adjusted Incidence of Cryptosporidiosis by County, Wyoming, 2008

	Total No. of Cases	Crude incidence rate (per 100,000 per year)	Age-adjusted incidence rate (per 100,000 per year)	SIR* (95%CI)
Albany	0	0.00	0.00	—
Big Horn	0	0.00	0.00	—
Campbell	13	31.35	31.65	5.74 (2.62-8.87)§
Carbon	0	0.00	0.00	—
Converse	0	0.00	0.00	—
Crook	0	0.00	0.00	—
Fremont	0	0.00	0.00	—
Goshen	0	0.00	0.00	—
Hot Springs	3	64.91	72.29	13.12 (-1.73-27.97)
Johnson	3	35.44	15.94	2.89 (-0.38-6.17)
Laramie	0	0.00	0.00	—
Lincoln	2	12.03	12.76	2.32 (-0.89-5.52)
Natrona	0	0.00	0.00	—
Niobrara	0	0.00	0.00	—
Park	0	0.00	0.00	—
Platte	0	0.00	0.00	—
Sheridan	0	0.00	0.00	—
Sublette	1	11.83	13.83	2.51 (-2.41-7.43)
Sweetwater	0	0.00	0.00	—
Teton	0	0.00	0.00	—
Uinta	1	4.85	6.11	1.11 (-1.06-3.28)
Washakie	1	12.79	13.42	2.44 (-2.34-7.21)
Weston	1	14.24	18.55	3.37 (-3.23-9.96)
Total	25	5.51	5.10	1.40 (0.85-1.95)†

*Wyoming state population used as “standard” population when calculating age-adjusted estimates for each county.

† SIR calculated using estimated national incidence rate of 3.7 cases per 100,000 per year.

§ Estimate is statistically different than the expected incidence rate. Estimates of greater than 1.00 indicate incidence is greater than what is expected and estimates less than 1.00 indicate incidence is less than what is expected and that these differences cannot be explained by differences in the age distribution of the population.

Table 14: Clinical Characteristics among Cases of Cryptosporidiosis, Wyoming, 2008

	Total, (%)
Had gastrointestinal symptoms	
Yes	24 (96.0%)
No	0 (0.0%)
Unknown	1 (4.0%)
Received antiparasitic treatment	
Yes	12 (48.0%)
No	8 (32.0%)
Unknown	5 (20.0%)

Table 15: Most Likely Source of Infection among Cases of Cryptosporidiosis, Wyoming, 2008.

	Total, (%)
Recreational water	4 (16.0%)
Unknown source	12 (48.0%)
Secondary transmission	0 (0.0%)
Animal source	3 (12.0%)
Daycare-associated	2 (8.0%)
Other water	1 (4.0%)
Drinking water	2 (8.0%)
Foreign travel	1 (4.0%)

Likely exposures are determined by making a “best guess” by trained epidemiologists based on the case patient’s exposure history and should not be viewed as a definitive source of infection.

Table 16: Frequency of Other Exposures among Cases of Cryptosporidiosis, Wyoming, 2008.

	Total
Ate at any restaurant	17 (68.0%)
Ate at any fast food restaurant	13 (52.0%)
Consumed water from a private well	12 (48.0%)
Swam in treated water venue	9 (32.0%)
Swam in untreated water venue	4 (16.0%)
Attended daycare	4 (16.0%)
Live with daycare attendee	3 (12.0%)
Out of state travel	11 (44.0%)
International travel	1 (4.0%)

Percentages can add up to more than 100% because case patients can report more than one of these exposures.

Table 17: Frequency of Reported High-Risk Occupations among Cases of Cryptosporidiosis, Wyoming, 2008.

	Total
Food-handling employee	0 (0.0%)
Healthcare worker with direct patient contact	1 (4.0%)
Daycare worker	0 (0.0%)

Public health guidelines call for the exclusion of these individuals from their high-risk occupational setting until 48 hours has passed since the last bout of diarrhea or vomiting, whichever occurs last.

Outbreaks of Cryptosporidiosis, Wyoming, 2008

The WDH Infectious Disease Epidemiology Program did not identify or investigate any outbreaks of cryptosporidiosis in 2008.

Cyclosporiasis

Case definition

- Confirmed, symptomatic - a laboratory-confirmed case associated with at least one of the following symptoms, watery diarrhea, loss of appetite, weight loss, abdominal bloating and cramping, increased flatus, nausea, fatigue, and low-grade fever.
Laboratory confirmation is defined as the detection of Cyclospora oocysts:
 - By microscopic examination of stool, intestinal fluid or small bowel biopsy specimens, or
 - By demonstration of sporulation, or
 - By identification of Cyclospora DNA via polymerase chain reaction (PCR) in stool, duodenal/jejuna aspirates or small bowel biopsy specimens
- Confirmed, asymptomatic: a laboratory-confirmed case (via the above described laboratory techniques) associated with none of the above symptoms.

Summary

In 2008, no cases of cyclosporiasis were reported to the WDH Infectious Disease Epidemiology Program (0.00 cases per 100,000 per year). The incidence of cyclosporiasis in Wyoming was statistically equivalent to the estimated US incidence (0.03 cases per 100,000 per year) based on CDC National Notifiable Disease Surveillance System.

Outbreaks of Cyclosporiasis

The WDH Infectious Disease Epidemiology Program did not investigate any outbreaks of cyclosporiasis in 2008.

***Escherichia coli*, shiga toxin-producing (O157:H7, non-O157, or untyped)**

Case definition

- Confirmed – a case that meets the laboratory criteria for diagnosis. When available, O and H antigen serotype characterization should be reported.
 - Isolation of Shiga toxin-producing *Escherichia coli* from a clinical specimen.
Escherichia coli O157:H7 isolates may be assumed to be Shiga toxin-producing. For all other *E. coli* isolates, Shiga toxin production or the presence of Shiga toxin genes must be determined to be considered STEC.
- Probable
 - A case with isolation of *E. coli* O157 from a clinical specimen, without confirmation of H antigen or Shiga toxin production, or
 - A clinically compatible case that is epidemiologically linked to a confirmed or probable case, or
 - Identification of an elevated antibody titer to a known Shiga toxin-producing *E. coli* serotype from a clinically compatible case
- Suspect
 - A case of postdiarrheal HUS or TTP, or
 - Identification of Shiga toxin in a specimen from a clinically compatible case without the isolation of the Shiga toxin-producing *E. coli*.

**The case definition for STEC changed in 2000 to include all types of shiga-toxin producing E. coli infections, not just infections caused by E. coli O157:H7. The case definition changed again in 2005 to include classification for the identification of the shiga-toxin in the presence or absence of isolation of the bacteria.*

Summary

In 2008, twelve cases of shiga-toxin producing *Escherichia coli* (STEC) were reported to the WDH Infectious Disease Epidemiology Program (2.64 cases per 100,000 per year). Of the cases reported, nine (75.0%) were laboratory-confirmed and three (25.0%) were probable cases (epidemiologically-linked to a confirmed case). The incidence of STEC in Wyoming in 2008 was statistically greater than the estimated US incidence (1.12 cases per 100,000 per year) based on CDC National Notifiable Disease Surveillance System (SIR: 2.39, 95%CI: 1.04-3.75). The median age of cases of STEC was ten years (range: 0-64 years). Persons aged 0-4 years had the highest age-specific incidence rate (14.18 cases per 100,000 per year). Cases were more likely to be male (83.3%) than female (16.7%). A definitive source of infection was not found for two-thirds (66.7%) of all cases. A zoonotic source of infection was suspected in 25.0% of cases.

Lincoln County reported the highest age-adjusted incidence rate (17.54 cases per 100,000 per year); however this difference was not statistically significant due to a small number of cases being reported. Laramie, Natrona, Park, Sweetwater, Teton and Uinta Counties reported cases in 2008, and the age-adjusted incidence rates in those counties were statistically equivalent with the expected state rate. All other counties did not report a case of STEC in 2008

Table 18: Occurrence of Shiga toxin-producing *E. coli* Infections, Wyoming, 2008

Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	1	0	1	0	1	3	1	0	0	2	0	0	9
Probable	0	0	0	1	0	1	0	0	0	1	0	0	3

Figure 6: Incidence of Shiga-Toxin Producing *Escherichia coli* Infections (O157:H7, non-O157, or untyped) by Month Reported, Wyoming, 2008

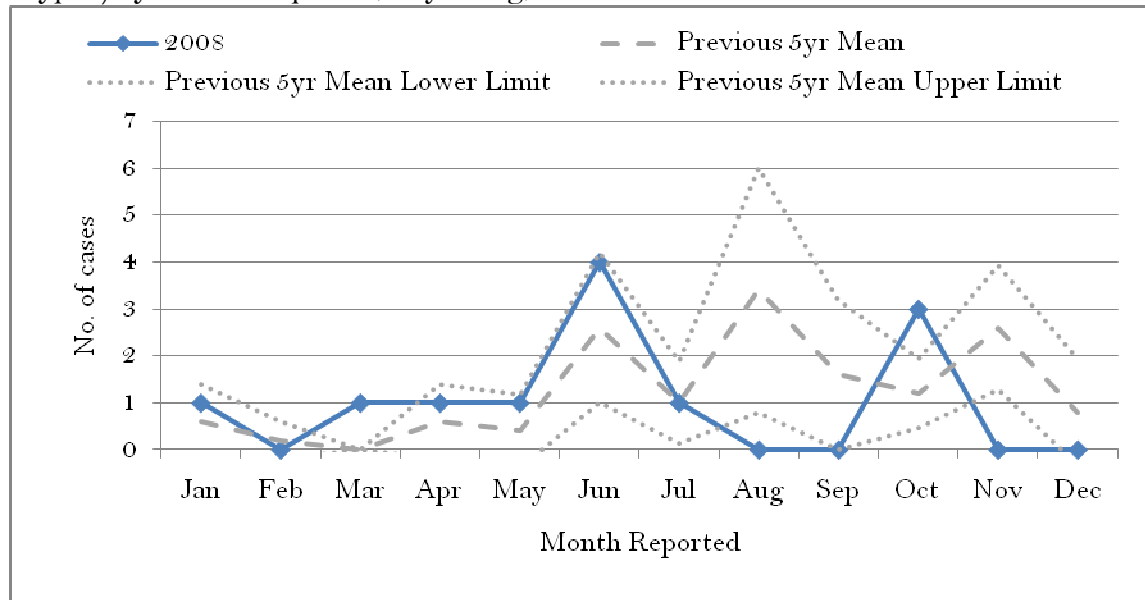


Table 19: Demographics of Case Patients with Shiga-Toxin Producing *Escherichia coli* Infections (O157:H7, non-O157, or untyped) (N=12), Wyoming, 2008

		Total n(%)
Age		
	0-4 years	5 (41.7%)
	5-14 years	1 (8.3%)
	15-24 years	2 (16.7%)
	25-39 years	2 (16.7%)
	40-64 years	2 (16.7%)
	≥65 years	0 (0.0%)
	Unknown	0 (0.0%)
Median age		10 yrs
Age range:		0-64 yrs
Gender		
	Female	2 (16.7%)
	Male	10 (83.3%)
Hospitalized		
	Yes	6 (31.6%)
	No	10 (52.6%)
	Unknown	3 (15.8%)
Median no. of days hospitalized		3 days
Range of no. of days hospitalized		3 days
Outbreak status		
	Outbreak/ cluster related	0 (0.0%)

Figure 7: Age Distribution of Cases of Shiga-Toxin Producing *Escherichia coli* (O157:H7, non-O157, or untyped), Wyoming, 2008

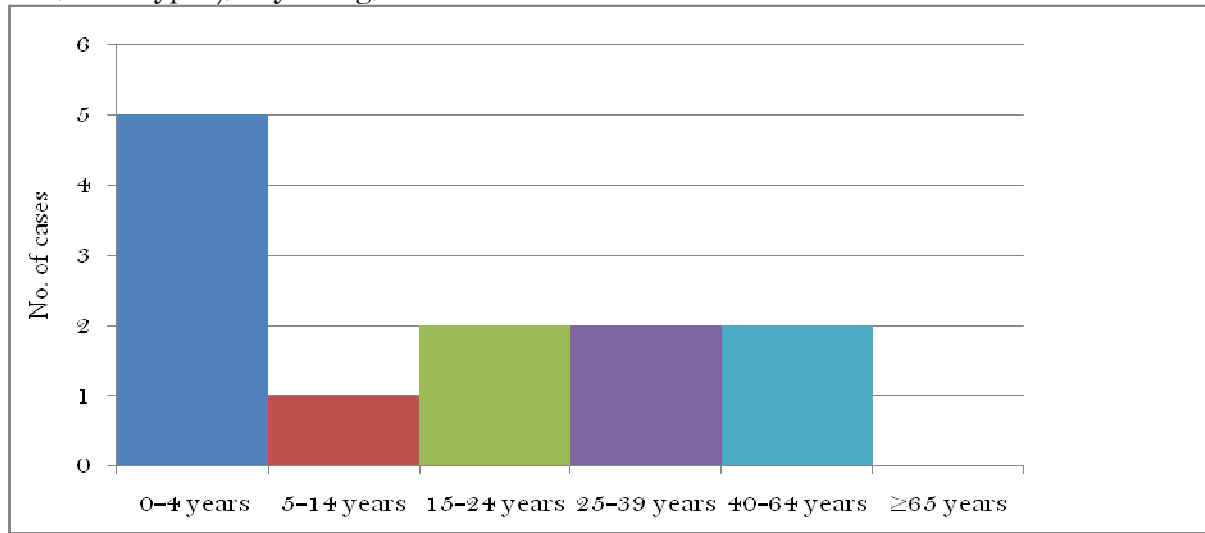


Table 20: Crude and Age-adjusted Incidence of Shiga-Toxin Producing *Escherichia coli* (O157:H7, non-O157, or untyped) by County, Wyoming, 2008

	Total No. of Cases	Crude incidence rate (per 100,000 per year)	Age-adjusted incidence rate (per 100,000 per year)	SIR* (95%CI)
Albany	0	0.00	0.00	—
Big Horn	0	0.00	0.00	—
Campbell	0	0.00	0.00	—
Carbon	0	0.00	0.00	—
Converse	0	0.00	0.00	—
Crook	0	0.00	0.00	—
Fremont	0	0.00	0.00	—
Goshen	0	0.00	0.00	—
Hot Springs	0	0.00	0.00	—
Johnson	0	0.00	0.00	—
Laramie	1	1.14	1.50	0.57 (-0.55-1.68)
Lincoln	3	18.04	17.54	6.65 (-0.87-14.17)
Natrona	1	1.37	1.41	0.53 (-0.51-1.58)
Niobrara	0	0.00	0.00	—
Park	2	7.25	5.17	1.96 (-0.76-4.67)
Platte	0	0.00	0.00	—
Sheridan	0	0.00	0.00	—
Sublette	0	0.00	0.00	—
Sweetwater	3	7.51	7.09	2.69 (-0.35-5.73)
Teton	1	4.54	4.39	1.66 (-1.60-4.92)
Uinta	1	4.85	6.11	2.31 (-2.22-6.85)
Washakie	0	0.00	0.00	—
Weston	0	0.00	0.00	—
Total	12	2.64	2.68	2.39 (1.04-3.75)†§

*Wyoming state population used as “standard” population when calculating age-adjusted estimates for each county.

† SIR calculated using estimated national incidence rate of 1.12 cases per 100,000 per year.

§ Estimate is statistically different than the expected incidence rate. Estimates of greater than 1.00 indicate incidence is greater than what is expected and estimates less than 1.00 indicate incidence is less than what is expected and that these differences cannot be explained by differences in the age distribution of the population.

Table 21: Clinical Characteristics among Cases of Shiga-Toxin Producing *Escherichia coli* (O157:H7, non-O157, or untyped), Wyoming, 2008

	Total, (%)
Had gastrointestinal symptoms	
Yes	12 (100.0%)
No	0 (0.0%)
Unknown	0 (0.0%)
Specimen source	
Stool	9 (75.0%)
Blood	0 (0.0%)
Unspecified	3 (25.0%)
Bacterial isolate was confirmed at WPHL*	
Yes	7 (58.3%)
No	5 (41.7%)
E. coli subtypes (N=6)	
O157:H7	2 (16.7%)
O26, unspecified	3 (25.0%)
O103:H11	1 (8.3%)
Received antibiotic	
Yes	4 (33.3%)
No	6 (50.0%)
Unknown	2 (16.7%)

* Wyoming state statute requires clinical laboratories to send confirmed shiga toxin-producing *E. coli* isolates to the Wyoming Public Health Laboratory for confirmation, subtyping and pulsed-field gel electrophoresis analysis.

Table 22: Most Likely Source of Infection among Cases of Shiga-Toxin Producing *Escherichia coli* (O157:H7, non-O157, or untyped), Wyoming, 2008.

	Total, (%)
Unknown source	8 (66.7%)
Animal source	3 (25.0%)
Recreational water	0 (0.0%)
Food at home	0 (0.0%)
Foreign travel	1 (8.3%)
Multiple sources	0 (0.0%)
Food at restaurant	0 (0.0%)
Raw milk	0 (0.0%)
Secondary transmission	0 (0.0%)

Likely exposures are determined by making a “best guess” by trained epidemiologists based on the case patient’s exposure history and should not be viewed as a definitive source of infection.

Table 23: Frequency of Other Exposures among Cases of Shiga-Toxin Producing *Escherichia coli* (O157:H7, non-O157, or untyped), Wyoming, 2008.

	Total
Ate at any restaurant	8 (66.7%)
Ate at any fast food restaurant	6 (50.0%)
Consumed water from a private well	2 (16.7%)
Swam in treated water venue	3 (25.0%)
Swam in untreated water venue	0 (0.0%)
Attended daycare	2 (16.7%)
Live with daycare attendee	1 (8.3%)
Out of state travel	6 (50.0%)
International travel	1 (8.3%)

Percentages can add up to more than 100% because case patients can report more than one of these exposures.

Table 24: Frequency of Reported High-Risk Occupations among Cases of Shiga-Toxin Producing *Escherichia coli* (O157:H7, non-O157, or untyped), Wyoming, 2008.

	Total
Food-handling employee	0 (0.0%)
Healthcare worker with direct patient contact	0 (0.0%)
Daycare worker	0 (0.0%)

Public health guidelines call for the exclusion of these individuals from their high-risk occupational setting until two consecutively negative stool samples are acquired at least 72 hours after the cessation of antibiotics.

Outbreaks of Shiga-Toxin Producing *Escherichia coli* (O157:H7, non-O157, or untyped), Wyoming, 2008

The WDH Infectious Disease Epidemiology Program did not investigate any outbreaks of shiga toxin-producing *E. coli* infections in 2008.

Giardiasis

Case definition

- Confirmed – a case that is laboratory confirmed via one of the following methods:
 - Demonstration of *G. lamblia* cysts in stool, or
 - Demonstration of *G. lamblia* trophozoites in stool, duodenal fluid, or small-bowel biopsy, or
 - Demonstration of *G. lamblia* antigen in stool by a specific immunodiagnostic test (e.g., enzyme-linked immunosorbent assay)
- Probable – a clinically compatible case that is epidemiologically linked to a confirmed case

Summary

In 2008, 51 cases of giardiasis were reported to the WDH Infectious Disease Epidemiology Program (11.24 cases per 100,000 per year). Of the cases reported, 45 (88.2%) were laboratory-confirmed and 6 (11.8%) were probable cases (epidemiologically-linked to a confirmed case). The incidence of giardiasis in Wyoming in 2008 was statistically greater than the estimated US incidence (6.31 cases per 100,000 per year) based on CDC National Notifiable Disease Surveillance System (SIR: 1.79, 95%CI: 1.30-2.28). The median age of cases of giardiasis was 27 years (range: 0-92 years). Persons aged 0-4 years had the highest age-specific incidence rate (31.20 cases per 100,000 per year). Cases were more likely to be female (54.9%) than male (45.1%). A suspected source of infection was not found for nearly half (47.0%) of all cases. Foreign travel was the suspected source for approximately 20% of all cases in 2008.

Crook County reported the highest age-adjusted incidence rate (29.02 cases per 100,000 per year), which was four times greater than the expected statewide incidence rate (7.20 cases per 100,000 per year). In addition to Crook County, Sheridan County (16.41 cases per 100,000 per year) and Teton County (16.60 cases per 100,000 per year) had age-adjusted incidence rates that were statistically higher than the statewide rate. Niobrara County did not report any cases during the time period of interest. Carbon (2.19 cases per 100,000 per year), Laramie (3.42 cases per 100,000 per year), and Natrona (2.17 cases per 100,000 per year) Counties had age-adjusted incidence rates that were statistically lower than the statewide rate. All other counties had age-adjusted incidence rates that were statistically equivalent to the statewide incidence rate.

Table 25: Occurrence of Giardiasis by Case Status, Wyoming, 2008

Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	3	3	4	2	2	3	3	7	3	5	6	4	45
Probable	0	0	0	2	0	0	0	3	0	1	0	0	6

Figure 8: Incidence of Giardiasis by Month Reported, Wyoming, 2008

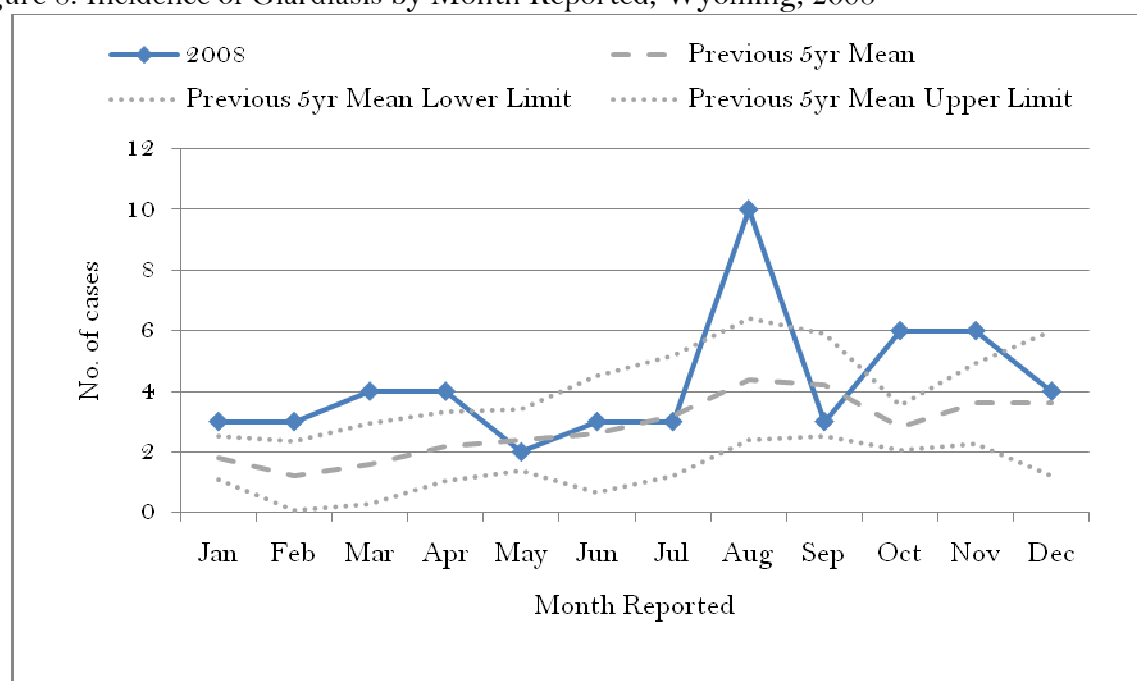


Table 26: Demographics of Case Patients with Giardiasis (N=51), Wyoming, 2008

		Total n(%)
Age		
0-4 years		11 (21.6%)
5-14 years		9 (17.7%)
15-24 years		3 (5.9%)
25-39 years		7 (13.7%)
40-64 years		17 (33.3%)
≥65 years		4 (7.8%)
Unknown		0 (0.0%)
Median age		27 yrs
Age range:		0-92 yrs
Gender		
Female		28 (54.9%)
Male		23 (45.1%)
Hospitalized		
Yes		0 (0.0%)
No		46 (90.2%)
Unknown		5 (9.8%)
Median no. of days hospitalized		n/a
Range of no. of days hospitalized		n/a
Outbreak status		
Outbreak/ cluster related		7 (13.7%)

Figure 9: Age Distribution of Cases of Giardiasis (N=51), Wyoming, 2008

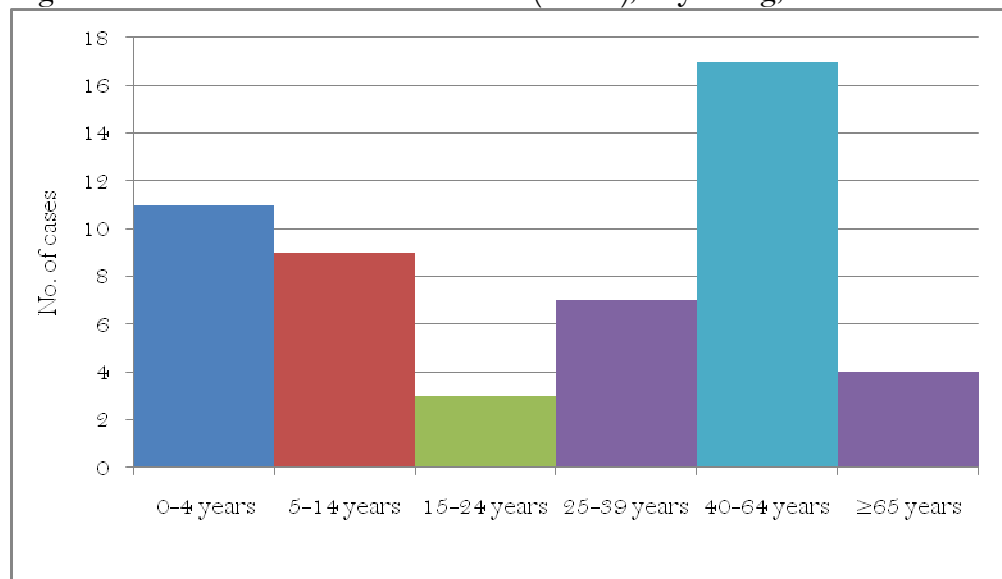


Table 27: Crude and Age-adjusted Incidence Rates of Giardiasis by County, Wyoming, 2008

	Total No. of Cases	Crude incidence rate (per 100,000 per year)	Age-adjusted incidence rate (per 100,000 per year)	SIR* (95%CI)
Albany	7	21.37	28.91	2.57 (0.67-4.48)
Big Horn	1	8.83	11.85	1.05 (-1.01-3.12)
Campbell	6	14.47	16.32	1.45 (0.29-2.61)
Carbon	0	0.00	0.00	—
Converse	0	0.00	0.00	—
Crook	4	61.95	79.30	7.06 (0.14-13.97)
Fremont	4	10.50	11.41	1.02 (0.02-2.01)
Goshen	0	0.00	0.00	—
Hot Springs	0	0.00	0.00	—
Johnson	2	23.63	32.98	2.93 (-1.13-7.00)
Laramie	1	1.14	1.39	0.12 (-0.12-0.37)
Lincoln	2	12.03	15.66	1.39 (-0.54-3.32)
Natrona	3	4.10	3.99	0.36 (-0.05-0.76)
Niobrara	0	0.00	0.00	—
Park	0	0.00	0.00	—
Platte	0	0.00	0.00	—
Sheridan	7	24.42	23.71	2.11 (0.55-3.67)
Sublette	2	23.65	21.53	1.92 (-0.74-4.57)
Sweetwater	3	7.51	6.75	0.60 (-0.08-1.28)
Teton	6	27.25	25.64	2.28 (0.46-4.11)
Uinta	1	4.85	6.11	0.54 (-0.52-1.61)
Washakie	0	0.00	0.00	—
Weston	2	28.48	20.19	1.80 (-0.69-4.29)
Total	51	11.24	11.29	1.79 (1.30-2.28)†§

*Wyoming state population used as “standard” population when calculating age-adjusted estimates for each county.

† SIR calculated using estimated national incidence rate of 6.31 cases per 100,000 per year.

§ Estimate is statistically different than the expected incidence rate. Estimates of greater than 1.00 indicate incidence is greater than what is expected and estimates less than 1.00 indicate incidence is less than what is expected and that these differences cannot be explained by differences in the age distribution of the population.

Table 28: Clinical Characteristics among Cases of Giardiasis Wyoming, 2008

	Total, (%)
Had gastrointestinal symptoms	
Yes	41 (80.4%)
No	2 (3.9%)
Unknown	8 (15.7%)
Received antiparasitic	
Yes	28 (54.9%)
No	8 (15.7%)
Unknown	15 (29.4%)

Table 29: Most Likely Source of Infection among Cases of Giardiasis Wyoming, 2008.

	Total, (%)
Unknown source	24 (47.1%)
Recreational water	5 (9.8%)
Foreign travel	10 (19.6%)
Water, other	3 (5.9%)
Drinking water	3 (5.9%)
Animal source	1 (2.0%)
Daycare	1 (2.0%)
Secondary transmission	3 (5.9%)
Food-restaurant	0 (0.0%)

Likely exposures are determined by making a “best guess” by trained epidemiologists based on the case patient’s exposure history and should not be viewed as a definitive source of infection.

Table 30: Frequency of Other Exposures among Cases of Giardiasis, Wyoming, 2008.

	Total
Ate at any restaurant	100 (45.7%)
Ate at any fast food restaurant	38 (17.4%)
Consumed water from a private well	42 (19.2%)
Swam in treated water venue	23 (10.5%)
Swam in untreated water venue	67 (30.6%)
Attended daycare	20 (9.1%)
Live with daycare attendee	16 (7.3%)
Out of state travel	60 (27.4%)
International travel	25 (11.4%)

Percentages can add up to more than 100% because case patients can report more than one of these exposures.

Table 31: Frequency of Reported High-Risk Occupations among Cases of Giardiasis, Wyoming, 2008.

	Total
Food-handling employee	0 (0.0%)
Healthcare worker with direct patient contact	0 (0.0%)
Daycare worker	0 (0.0%)

Public health guidelines call for the exclusion of these individuals from their high-risk occupational setting until 48 hours after the cessation of diarrhea.

Outbreaks of Giardiasis, 2008

Investigation of Illness Associated with RV Park, Sheridan County, 2008

In November 2008, WDH Infectious Disease Epidemiology Program began a cooperative investigation with the US Environmental Protection Agency and the Wyoming Department of Environmental Quality regarding reports of illness among past and current residents of a rural RV park in Sheridan County. Staff from the WDH Infectious Disease Epidemiology Program completed interviews on 27 RV park patrons; 22 reported recurring gastrointestinal illness. One person tested positive for giardiasis at an out-of-state laboratory. WDH was not been able to determine if the RV park's well water system was the source of the illness or if there are other possible sources. EPA continues to investigate problems with the RV park's well system, which was considered to be a public water system, and DEQ continues to investigate problems with the RV park's wastewater system. The presence of these problems suggests that water system was a potential source of illness.

Hepatitis A

Case definition

- Confirmed – An acute illness with a) discrete onset of symptoms and b) jaundice or elevated serum aminotransferase levels that is laboratory-confirmed via detection of immunoglobulin M (IgM) antibody to hepatitis A virus (anti-HAV IgM).
- Probable – a case that meets the clinical case definition (discrete onset of symptoms and jaundice or elevated serum aminotransferase levels) and occurs in a person who has an epidemiologic link to a person who has laboratory-confirmed hepatitis A infection (i.e., household or sexual contact with an infected person during the 15-50 days before the onset of symptoms)

Summary

In 2008, 2 cases of acute Hepatitis A were reported to the WDH Infectious Disease Epidemiology Program (0.44 cases per 100,000 per year). Both cases were laboratory-confirmed. The incidence of acute Hepatitis A in Wyoming was statistically less than the estimated US incidence (1.20 cases per 100,000 per year) based on CDC National Notifiable Disease Surveillance System (SIR: 0.38, 95%CI: -0.15-0.90). The median age of cases of acute Hepatitis A was 7 years (range: 5-9 years). Persons aged 5-14 years had the highest age-specific incidence rate (2.51 cases per 100,000 per year). One case was male and the other was female. In 2008, Natrona County was the only Wyoming county to report cases of acute Hepatitis A (age adjusted incidence rate: 3.74 cases per 100,000 per year) and Natrona County's age-adjusted incidence rate was not statistically greater than the state's expected incidence rate. Both reported cases were part of a household cluster of acute Hepatitis A infection.

Table 32: Incidence of Acute Hepatitis A Infection by Month, Wyoming, 2008.

Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	0	2	0	0	0	0	0	0	0	0	0	0	2
Probable	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	2	0	0	0	0	0	0	0	0	0	0	2

Outbreaks of Acute Hepatitis A Infection, 2008

Household Cluster of Hepatitis A Infection, Natrona County, 2008

In February 2008, the WDH Infectious Disease Epidemiology identified a laboratory-confirmed case of Hepatitis A in a child from Natrona County. The Casper Natrona County Health Department conducted routine epidemiologic follow-up on the case. At the time of the follow-up interview, no other household members were symptomatic. Household members were referred to both their local healthcare provider and the county health department of prophylaxis per recommended public health guidelines and received the vaccine over the next several days. Subsequently, the WDH Infectious Disease Epidemiology received a report confirming Hepatitis A infection in the index case patient's sibling. The sibling's onset date was shortly after follow-up, and this child was likely infected before receiving the dose of vaccine. The family had traveled to various locations in Mexico during the months of December and January. The sibling's infection could have been primary (acquired from source in Mexico) or secondary (acquired from the index case). No other cases in the family were identified.

Legionellosis

Case definition

- Confirmed – a case that is laboratory confirmed via one of the following methods:
 - By culture: isolation of any *Legionella* organism from respiratory secretions, lung tissue, pleural fluid, or other normally sterile fluid.
 - By detection of *Legionella pneumophila* serogroup 1 antigen in urine using validated reagents.
 - By seroconversion: fourfold or greater rise in specific serum antibody titer to *Legionella pneumophila* serogroup 1 using validated reagents.
- Suspect – a case where *Legionella* has been detected by the following methods
 - By seroconversion: fourfold or greater rise in antibody titer to specific species or serogroups of *Legionella* other than *L. pneumophila* serogroup 1 (e.g., *L. micdadei*, *L. pneumophila* serogroup 6).
 - By seroconversion: fourfold or greater rise in antibody titer to multiple species of *Legionella* using pooled antigen and validated reagents.
 - By the detection of specific *Legionella* antigen or staining of the organism in respiratory secretions, lung tissue, or pleural fluid by direct fluorescent antibody (DFA) staining, immunohistochemistry (IHC), or other similar method, using validated reagents.
 - By detection of *Legionella* species by a validated nucleic acid assay

Summary

In 2008, no cases of legionellosis were reported to the WDH Infectious Disease Epidemiology Program (0.00 cases per 100,000 per year). The incidence of legionellosis in Wyoming was equivalent to or less than the estimated US incidence (0.88 cases per 100,000 per year) based on CDC National Notifiable Disease Surveillance System (SIR: incalculable).

Outbreaks of Legionellosis, 2008

The Wyoming Department of Health did not investigate any outbreaks of legionellosis in 2008.

Leptospirosis

Case definition

- Confirmed – a clinically compatible case that is laboratory confirmed by one of the following methods:
 - Isolation of *Leptospira* from a clinical specimen, or
 - Fourfold or greater increase in *Leptospira* agglutination titer between acute- and convalescent-phase serum specimens obtained greater than or equal to 2 weeks apart and studied at the same laboratory, or
 - Demonstration of *Leptospira* in a clinical specimen by immunofluorescence
- Probable - a clinically compatible case with supportive serologic findings (i.e., a *Leptospira* agglutination titer of greater than or equal to 200 in one or more serum specimens)

**This condition is no longer nationally notifiable, but it is reportable in the State of Wyoming.*

Summary

In 2008, no cases of leptospirosis were reported to the WDH Infectious Disease Epidemiology Program (0.00 cases per 100,000 per year). The incidence of leptospirosis in Wyoming was statistically equivalent to the estimated US incidence (0.06 cases per 100,000 per year). (SIR: incalculable).

Outbreaks of Leptospirosis

The WDH Infectious Disease Epidemiology Program did not investigate any outbreaks of leptospirosis in 2008.

Listeriosis

Case definition

- Confirmed: A clinically compatible case that is laboratory-confirmed by one of the following methods:
 - Isolation of *L. monocytogenes* from a normally sterile site (e.g., blood or cerebrospinal fluid [CSF] or, less commonly, joint, pleural, or pericardial fluid)
 - In the setting of miscarriage or stillbirth, isolation of *L. monocytogenes* from placental or fetal tissue

Summary

In 2008, two cases of listeriosis were reported to the WDH Infectious Disease Epidemiology Program (0.44 cases per 100,000 per year), both of which were laboratory-confirmed via culture. The incidence of listeriosis in Wyoming was statistically equivalent to the estimated US incidence (0.26 cases per 100,000 per year) based on CDC Nationally Notifiable Disease Surveillance System (SIR: 1.65, 95%CI: -0.64-3.95). The median age of cases of listeriosis was 60 years (range: 53-60 years). Persons aged 65 years or older had the highest age-specific incidence rate (2.12 cases per 100,000 per year). Both cases were male. A definitive source of infection could not be identified for both cases. None of the cases reported working in a sensitive occupation like food-handling, healthcare or childcare. Cases were reported in Albany and Uinta Counties. Albany County reported the highest age-adjusted incidence rate (3.60 cases per 100,000 per year), which was eight times greater than the expected statewide incidence rate (0.10 cases per 100,000 per year). However, that difference was not statistically significant due to the small number of cases reported.

Table 33: Incidence of Listeriosis by Month, Wyoming, 2008.

Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	0	0	0	0	0	0	1	0	0	0	1	0	2
Probable	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	1	0	0	0	1	0	2

Figure 10: Incidence of Listeriosis by Month Reported (N=2), Wyoming, 2008

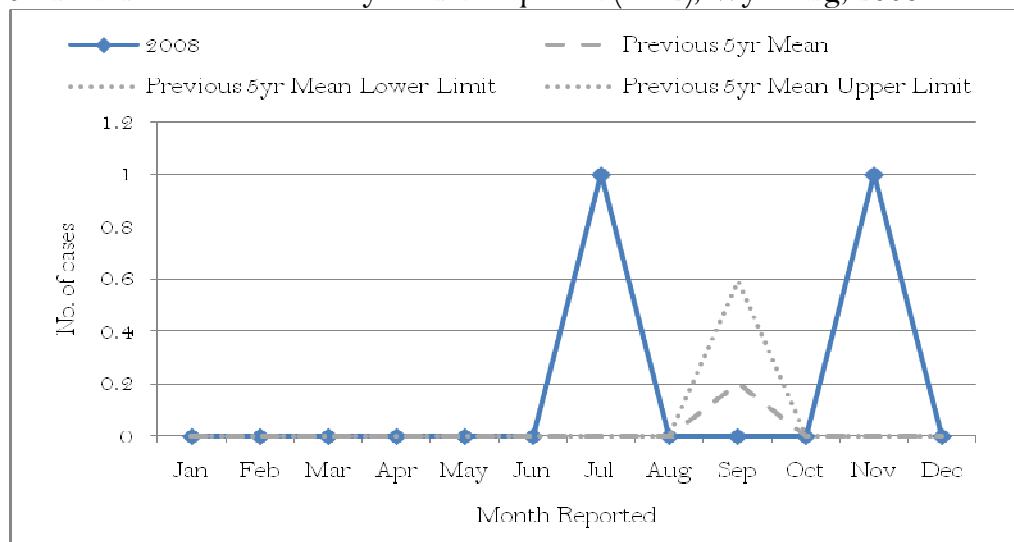


Table 34: Demographics of Case Patients with Listeriosis (N=2), Wyoming, 2008

		Total n(%)
Age		
0-4 years		0 (0.0%)
5-14 years		0 (0.0%)
15-24 years		0 (0.0%)
25-39 years		0 (0.0%)
40-64 years		1 (50.0%)
≥65 years		1 (50.0%)
Unknown		0 (0.0%)
Median age		60 years
Age range:		53-67 years
Gender		
Female		0 (0.0%)
Male		2 (100.0%)
Hospitalized		
Yes		2 (100.0%)
No		0 (0.0%)
Unknown		0 (0.0%)
Median no. of days hospitalized		Unk
Range of no. of days hospitalized		Unk
Outbreak status		
Outbreak/ cluster related		0 (0.0%)

Figure 11: Age Distribution of Cases of Listeriosis (N=2), Wyoming, 2008

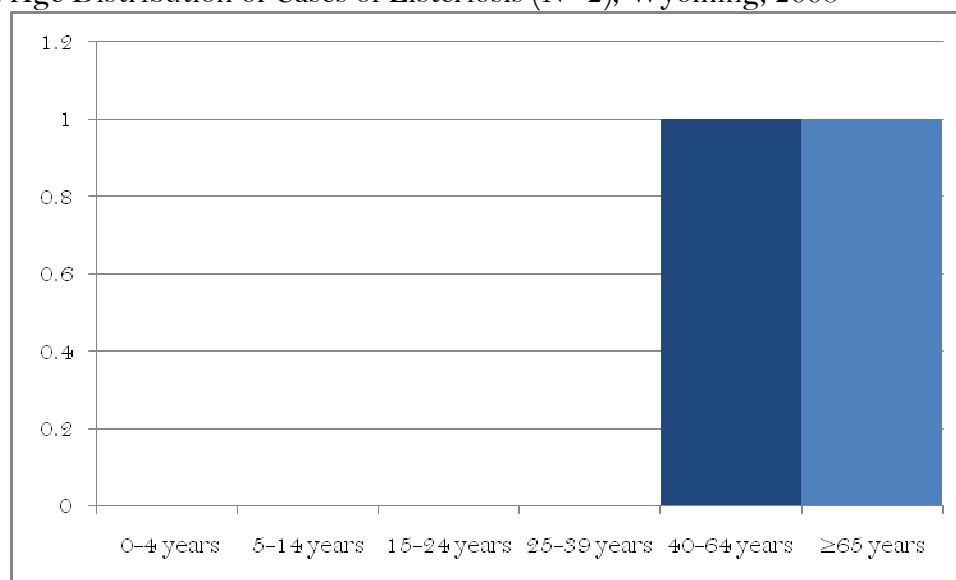


Table 35: Crude and Age-adjusted Incidence of Listeriosis by County, Wyoming, 2008

	Total No. of Cases	Crude incidence rate (per 100,000 per year)	Age-adjusted incidence rate (per 100,000 per year)	SIR* (95%CI)
Albany	1	3.05	3.60	8.19 (-7.87-24.25)
Big Horn	0	0.00	0.00	—
Campbell	0	0.00	0.00	—
Carbon	0	0.00	0.00	—
Converse	0	0.00	0.00	—
Crook	0	0.00	0.00	—
Fremont	0	0.00	0.00	—
Goshen	0	0.00	0.00	—
Hot Springs	0	0.00	0.00	—
Johnson	0	0.00	0.00	—
Laramie	0	0.00	0.00	—
Lincoln	0	0.00	0.00	—
Natrona	0	0.00	0.00	—
Niobrara	0	0.00	0.00	—
Park	0	0.00	0.00	—
Platte	0	0.00	0.00	—
Sheridan	0	0.00	0.00	—
Sublette	0	0.00	0.00	—
Sweetwater	0	0.00	0.00	—
Teton	0	0.00	0.00	—
Uinta	1	4.83	3.55	8.06 (-7.74-23.87)
Washakie	0	0.00	0.00	—
Weston	0	0.00	0.00	—
Total	2	0.44	0.43	1.65 (-0.64-3.95)†

*Wyoming state population used as “standard” population when calculating age-adjusted estimates for each county.

† SIR calculated using estimated national incidence rate of 0.26 cases per 100,000 per year.

§ Estimate is statistically different than the expected incidence rate. Estimates of greater than 1.00 indicate incidence is greater than what is expected and estimates less than 1.00 indicate incidence is less than what is expected and that these differences cannot be explained by differences in the age distribution of the population.

Table 36: Clinical Characteristics among Cases of Listeriosis, Wyoming, 2008

	Total, (%)
Had gastrointestinal symptoms	
Yes	0 (0.0%)
No	1 (50.0%)
Unknown	1 (50.0%)
Specimen source	
Stool	1 (50.0%)
Blood	1 (50.0%)
Bacterial isolate was confirmed at WPHL*	
Yes	2 (100.0%)
No	0 (0.0%)
Species of Listeria	
<i>L. monocytogenes</i>	2 (100.0%)

Received antibiotic	
Yes	2 (100.0%)
No	0 (0.0%)
Unknown	0 (0.0%)

** Wyoming state statute requires clinical laboratories to send confirmed *Listeria* isolates to the Wyoming Public Health Laboratory for confirmation and pulsed-field gel electrophoresis analysis.*

Outbreaks of Listeriosis, 2008

The Wyoming Department of Health did not investigate any outbreak of listeriosis in 2003-2008.

Salmonellosis

Case definition

- Confirmed – a case that is laboratory confirmed by isolation of *Salmonella* bacteria from any clinical specimen
- Probable – a clinically compatible case that is epidemiologically-linked to a laboratory-confirmed case

Summary

In 2008, 81 cases of salmonellosis were reported to the WDH Infectious Disease Epidemiology Program (17.85 cases per 100,000 per year). Of the cases reported, 74 (91.4%) were laboratory-confirmed and 7 (8.6%) were probable cases (epidemiologically-linked to a confirmed case). The incidence of salmonellosis in Wyoming was statistically equivalent to the estimated US incidence (14.0 cases per 100,000 per year) based on CDC FoodNet sites (SIR: 1.28, 95%CI: 1.00-1.56). The median age of cases of salmonellosis was 28 years (range: 0-88 years). Children aged 0-4 years had the highest age-specific incidence rate (51.05 cases per 100,000 per year), which was nearly three times higher than the incidence rate for the general population. Cases were more likely to be male (50.6%) than female (49.4%). While a definitive source of the infection could not be determined in nearly 59.3% of all cases, contact with animals (especially reptiles) is a common source of *Salmonella* infection in Wyoming. Direct or indirect contact with reptiles was the leading source of *Salmonella* infection in children 5 years of age or less (27.8%).

All Wyoming counties reported at least one case of salmonellosis in 2008, except Hot Springs, Lincoln, Sublette, and Washakie Counties. Weston County reported the highest age-adjusted incidence rate (70.75 cases per 100,000 per year), which was nearly four times the expected statewide incidence rate (13.97 cases per 100,000 per year). However, due to the small number of cases in Weston County, that rate difference was not statistically significant. In addition to Lincoln County, Park County (25.05 cases per 100,000 per year) also had an age-adjusted incidence rate that was statistically greater than the statewide incidence rate. Park County (3.41 cases per 100,000 per year) had an age-adjusted incidence rate that were statistically less than the statewide incidence rate. All other counties had age-adjusted incidence rates that were statistically equivalent to the statewide incidence rate.

Table 37: Occurrence of Salmonellosis by Month Reported and by Status, Wyoming, 2008

Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	7	3	6	7	4	5	5	8	10	8	6	5	74
Probable	0	0	1	0	0	2	0	1	1	0	0	2	7
Total	7	3	7	7	4	7	5	9	11	8	6	7	81

Figure 12: Incidence of Salmonellosis by Month Reported, Wyoming, 2003-2008

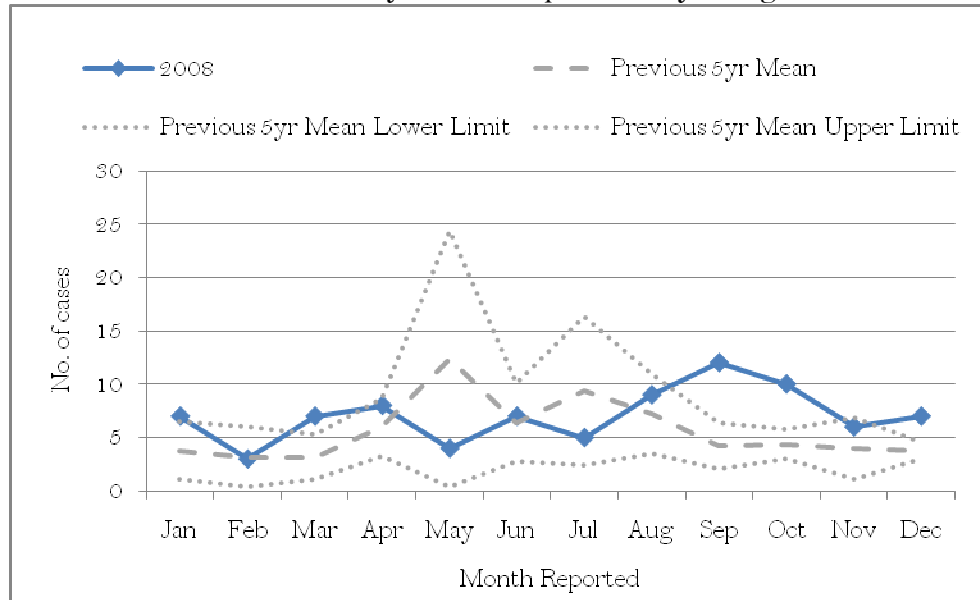


Table 38: Demographics of Case Patients with Salmonellosis (N=81), Wyoming, 2008

	Total n(%)
Age	
0-4 years	19 (22.2%)
5-14 years	7 (8.6%)
15-24 years	13 (16.1%)
25-39 years	9 (11.1%)
40-64 years	26 (32.1%)
≥65 years	8 (9.9%)
Unknown	0 (0.0%)
Median age	28 years
Age range:	0-88 years
Gender	
Female	40 (49.4%)
Male	41 (50.6%)
Hospitalized	
Yes	17 (21.0%)
No	63 (77.8%)
Unknown	1 (1.2%)
Median no. of days hospitalized	2.0 days
Range of no. of days hospitalized	1-14 days
Outbreak status	
Outbreak/ cluster related	14 (17.3%)

Figure 13: Age Distribution of Cases of Salmonellosis (N=81), Wyoming, 2008

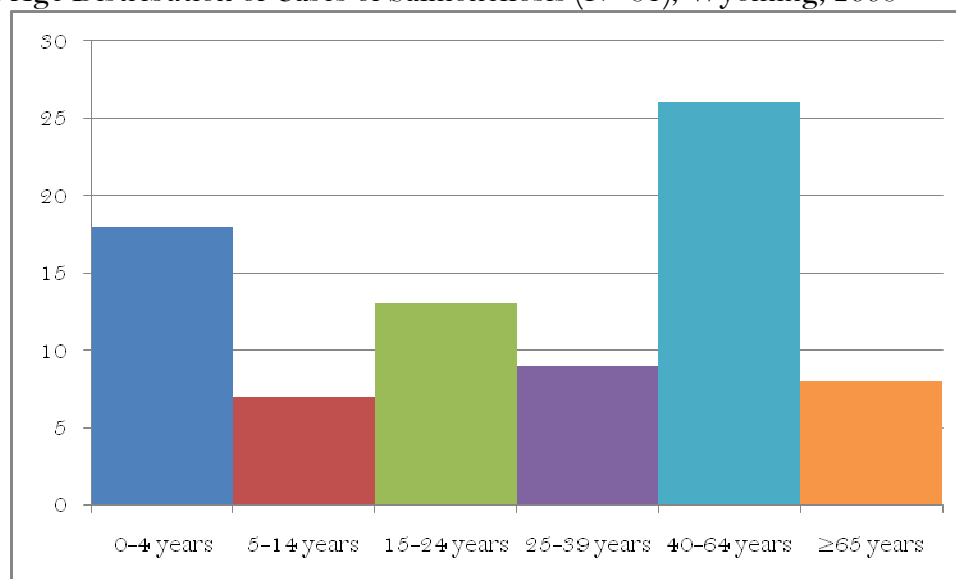


Table 39: Crude and Age-adjusted Incidence of Salmonellosis by County, Wyoming, 2008

	Total No. of Cases	Crude incidence rate (per 100,000 per year)	Age-adjusted incidence rate (per 100,000 per year)	SIR* (95%CI)
Albany	4	12.21	10.47	0.59 (0.01-1.16)
Big Horn	3	26.50	25.42	1.42 (-0.19-3.04)
Campbell	9	21.70	20.23	1.13 (0.39-1.87)
Carbon	3	19.20	22.21	1.24 (-0.16-2.65)
Converse	3	22.61	28.13	1.58 (-0.21-3.36)
Crook	1	15.49	10.96	0.61 (-0.59-1.82)
Fremont	5	13.12	13.77	0.77 (0.10-1.45)
Goshen	1	8.28	12.46	0.70 (-0.67-2.07)
Hot Springs	0	0.00	0.00	
Johnson	1	11.81	6.52	0.37 (-0.35-1.08)
Laramie	13	14.85	14.52	0.81 (0.37-1.26)
Lincoln	0	0.00	0.00	
Natrona	11	15.04	14.64	0.82 (0.34-1.30)
Niobrara	1	41.19	30.53	1.71 (-1.64-5.06)
Park	1	3.63	3.41	0.19 (-0.18-0.57)§
Platte	4	48.23	62.10	3.48 (0.07-6.89)
Sheridan	7	24.42	29.39	1.65 (0.43-2.87)
Sublette	0	0.00	0.00	
Sweetwater	5	12.52	12.77	0.72 (0.09-1.34)
Teton	2	9.08	13.57	0.76 (-0.29-1.81)
Uinta	3	14.55	10.64	0.60 (-0.08-1.27)
Washakie	0	0.00	0.00	
Weston	4	56.96	70.75	3.96 (0.08-7.85)
Total	81	17.85	17.90	1.28 (1.00-1.56)†

*Wyoming state population used as “standard” population when calculating age-adjusted estimates for each county.

† SIR calculated using estimated national incidence rate of 14.00 cases per 100,000 per year.

§ Estimate is statistically different than the expected incidence rate. Estimates of greater than 1.00 indicate incidence is greater than what is expected and estimates less than 1.00 indicate incidence is less than what is expected and that these differences cannot be explained by differences in the age distribution of the population.

Table 40: Clinical Characteristics among Cases of Salmonellosis, Wyoming, 2008

	Total, (%)
Had gastrointestinal symptoms	
Yes	68 (84.0%)
No	4 (4.9%)
Unknown	9 (11.1%)
Specimen source	
Stool	65 (87.8%)
Blood	5 (6.8%)
Urine	4 (5.4%)
Other	0 (0.0%)
Unknown	0 (0.0%)
Bacterial isolate was confirmed at WPHL*	
Yes	69 (85.2%)
No	12 (14.8%)
Received antibiotic	
Yes	35 (43.2%)
No	21 (25.9%)
Unknown	25 (30.9%)

* Wyoming state statute requires clinical laboratories to send confirmed *Salmonella* isolates to the Wyoming Public Health Laboratory for confirmation, subtyping and pulsed-field gel electrophoresis analysis.

Table 41: Reported *Salmonella* Serotypes (N=69) by Year, Wyoming, 2008.

	Total, (%)
Typhimurium	14 (20.3%)
Enteritidis	9 (13.0%)
Heidelberg	6 (8.7%)
I4,[5],12:i-	5 (7.2%)
Typhimurium var O5 (Copenhagen)	5 (7.2%)
Newport	4 (5.8%)
Litchfield	4 (5.8%)
Infantis	3 (4.4%)
Oranienberg	2 (2.9%)
Hadar	2 (2.9%)
Braenderup	2 (2.9%)
Agona	2 (1.5%)
Thompson	1 (1.5%)
Muechen	1 (1.5%)
Poona	1 (1.5%)
Dublin	1 (1.5%)
50:gz51:-	1 (1.5%)
Agbeni	1 (1.5%)
Baildon	1 (1.5%)

Coeln	1 (1.5%)
Concord	1 (1.5%)
Cotham	1 (1.5%)
Reading	1 (1.5%)

** Wyoming state statute requires clinical laboratories to send confirmed Salmonella isolates to the Wyoming Public Health Laboratory for confirmation, subtyping and pulsed-field gel electrophoresis analysis.*

Table 42: Most Likely Source of Infection among Cases of Salmonellosis, Wyoming, 2008.

	Total, (%)
Source not evident	48 (59.3%)
Food source at restaurant or other food venue	3 (3.7%)
Animal source	16 (19.8%)
Foreign travel	5 (6.2%)
Food source at home	4 (4.9%)
Daycare transmission	0 (0.0%)
Person-to-person transmission	2 (2.4%)
Multiple exposures	1 (1.2%)
Environmental contamination	0 (0.0%)
Occupational exposure	1 (1.2%)

Likely exposures are determined by making a "best guess" by trained epidemiologists based on the case patient's exposure history and should not be viewed as a definitive source of infection.

Table 43: Frequency of Certain Animal Exposures Reported by Cases of Salmonellosis, Wyoming, 2008.

	Total
Contact with dog	26 (32.1%)
Contact with cattle	3 (3.7%)
Contact with cat	17 (21.0%)
Contact with horse	2 (2.5%)
Contact with bird	5 (6.2%)
Contact with sheep	0 (0.0%)
Contact with pig	1 (1.2%)
Contact with goat	1 (1.2%)
Contact with rodent	2 (2.5%)
Contact with reptile	14 (17.3%)
Contact with amphibian	2 (2.5%)

Percentages can add up to more than 100% because case patients can report exposure to more than one of these types of animals.

Table 44: Frequency of Other Exposures among Cases of Salmonellosis, Wyoming, 2008.

	Total
Ate at any restaurant	47 (58.0%)
Ate at any fast food restaurant	22 (27.2%)
Consumed water from a private well	6 (7.4%)
Swam in treated water venue	5 (6.2%)
Swam in untreated water venue	8 (9.9%)
Attended daycare	4 (4.9%)
Live with daycare attendee	4 (4.9%)
Out of state travel	14 (17.3%)
International travel	5 (6.2%)

Percentages can add up to more than 100% because case patients can report more than one of these exposures.

Table 45: Frequency of Reported High-Risk Occupations among Cases of Salmonellosis, Wyoming, 2008.

	Total
Food-handling employee	3 (3.7%)
Healthcare worker with direct patient contact	2 (2.5%)
Daycare worker	0 (0.0%)

Public health guidelines call for the exclusion of these individuals from their high-risk occupational setting until the patient has provided two consecutively negative stool samples that were collected at least 24 hours apart and at least 72 hours after the cessation of antibiotic therapy.

Outbreaks of Salmonellosis, 2008

Outbreak of Salmonella Litchfield Cases, Campbell County, 2008

In March 2008, a total of four laboratory-confirmed cases of *Salmonella* Litchfield had been identified in Campbell County. Routine case follow-up revealed a local Mexican restaurant as a potential common source for 3 of the 4 cases. Additionally, the WDH Infectious Disease Epidemiology Program received a food complaint against the same restaurant in mid-February. The WDH Infectious Disease Epidemiology Program and Wyoming Department of Agriculture Consumer Health Services Division initiated an outbreak investigation. A restaurant inspection revealed two critical food safety violations, both violations in temperature control of food. Investigators completed interviews with all employees, and all employees were required to submit stool specimens for testing at the Wyoming Public Health Laboratory. No food-handling staff were found to be positive with *Salmonella*. The WDH Infectious Disease Epidemiology Program did not identify a food vehicle in the restaurant and did not identify any other cases of *Salmonella* Litchfield after the outbreak investigation began.

Multistate Outbreak of Salmonella Hadar Associated with Turkey Consumption, 2008

In August 2008, the WDH Infectious Disease Epidemiology Program was notified by the Minnesota Department of Health regarding a national outbreak of *Salmonella* Hadar with a distinct PFGE pattern associated with turkey consumption. Two Wyoming residents were found to have a PFGE match to the outbreak: 1) an adolescent Sheridan County resident and 2) an adult Uinta County resident. A turkey-specific questionnaire was administered to the Uinta County case. The Sheridan County case was not re-interviewed using the turkey-specific questionnaire due to recall bias (too much time had elapsed since his diagnosis and first interview and when WDH was notified of the outbreak). Follow-up with the Uinta County case revealed multiple turkey exposures while the patient was traveling to visit family in Utah. The patient's father, a Utah resident, was also a confirmed *Salmonella* Hadar case with an identical PFGE pattern. A total of 65 cases in the following states have been identified: Arkansas, Arizona, California, Colorado, Georgia, Hawaii, Iowa, Indiana, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New Mexico, New York, Pennsylvania, Texas, Utah, Virginia, Vermont, Wisconsin, and Wyoming. The precise source of the outbreak has not yet been identified.

Multistate Outbreak of Salmonella Typhimurium I4,[5],12:i:- Associated with Frozen, Stuffed Chicken Products, 2008

The Minnesota Department of Health identified an outbreak of *Salmonella* Typhimurium I4,[5],12:i:- associated with frozen, stuffed chicken products with a distinct, two-enzyme PFGE pattern (JPXX01.0642 and JPXA26.0331). A total of 32 isolates from 12 states had human isolates that match the outbreak strains. One case of salmonellosis from WY has a molecular match to this outbreak – an adult from Natrona County with onset in July. Follow-up did not reveal an epidemiologic link to this outbreak.

Multistate Outbreak of Salmonella Newport Associated with Ground Beef Consumption, 2008

The Colorado Department of Public Health and Environment identified an outbreak of *Salmonella* Newport where six Colorado cases and one Wyoming case had a two-enzyme PFGE match. Case follow-up revealed that most cases reported exposure to a specific type of ground beef distributed in the region. An adult from Albany County matched this outbreak and reports illness onset in mid-August. The Wyoming case patient possibly consumed the implicated beef at home.

Multistate Outbreak of Salmonella Typhimurium Associated with Peanut Butter, 2008

In December 2008, the WDH Infectious Disease Epidemiology Program identified two cases of salmonellosis in Laramie County. The cases were two children from the same household. PFGE analyses showed that the two cases were associated with a large national outbreak of *Salmonella* serotype Typhimurium associated with peanut butter and peanut butter-containing products. Public health officials from CDC and state health departments investigated the outbreak. A total of 529 individuals from 43 states and one person from Canada had been reported with the outbreak strain. Illness onset dates among confirmed cases ranged from September 1, 2008 to January 16, 2009. A total of 116 case patients were hospitalized. The WDH Infectious Disease Epidemiology Program identified only those two children in Wyoming with the outbreak strain. The implicated peanut butter products were all produced at one plant and were sold under a multitude of brand name products. (CDC. *Multistate Outbreak of Salmonella Infections Associated with Peanut Butter and Peanut Butter-Containing Products – United States, 2008-2009*. MMWR 2009;58).

Shigellosis

Case definition

- Confirmed – a case that is laboratory confirmed by isolation of *Shigella* bacteria from any clinical specimen
- Probable – a clinically compatible case that is epidemiologically-linked to a laboratory-confirmed case

Summary

In 2008, eight cases of shigellosis were reported to the WDH Infectious Disease Epidemiology Program (1.76 cases per 100,000 per year). All cases were laboratory-confirmed. The incidence of shigellosis in Wyoming was statistically less than the estimated US incidence (6.59 cases per 100,000 per year) based on CDC FoodNet sites (SIR: 0.27, 95%CI: 0.08-0.45). The median age of cases of shigellosis was 42.5 years (range: 3-86 years). Persons aged 65 years or older had the highest age-specific incidence rate (6.35 cases per 100,000 per year), which was approximately four times higher than the incidence rate for the general population. Cases were more likely to be female (62.5%) than male (37.5%). No evidence source of illness was found for 87.5% of case patients. One cases acquired the infection during foreign travel.

Carbon County reported the highest age-adjusted incidence rate (10.34 cases per 100,000 per year), but this rate was not statistically greater than the expected state rate. Fremont, Laramie, Natrona, Sweetwater, and Teton Counties reported cases of shigellosis in 2008, and their age-adjusted incidence rates were equivalent to the statewide incidence rate.

Table 46: Occurrence of Shigellosis by Year Reported and by Status, Wyoming, 2008

Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Confirmed	2	1	0	0	0	0	0	0	0	2	2	1	8
Probable	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	1	0	0	0	0	0	0	0	2	2	1	8

Figure 14: Incidence of Shigellosis by Month Reported, Wyoming, 2008

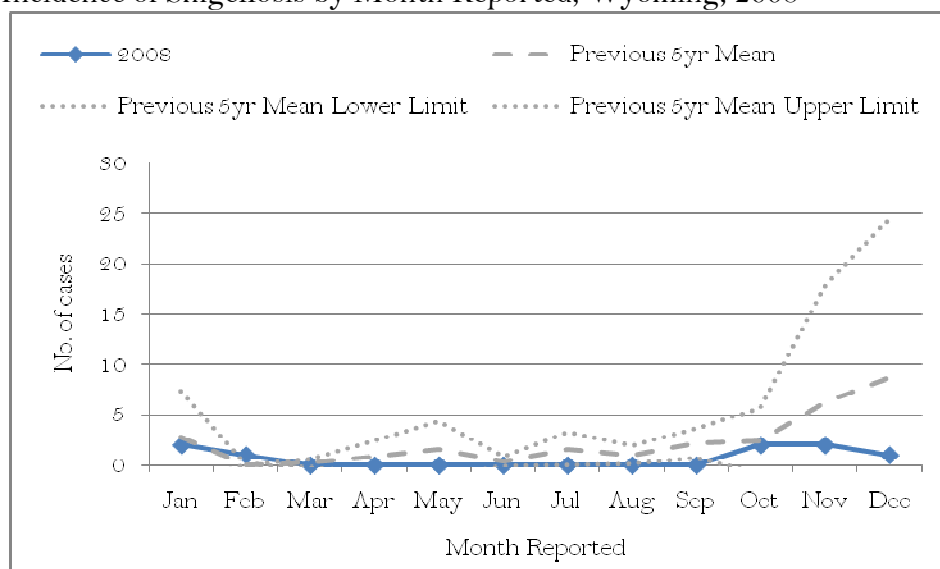


Table 47: Demographics of Case Patients with Shigellosis (N=8), Wyoming, 2008

	Total n(%)
Age	
0-4 years	1 (12.5%)
5-14 years	1 (12.5%)
15-24 years	1 (12.5%)
25-39 years	1 (12.5%)
40-64 years	1 (12.5%)
≥65 years	3 (37.5%)
Unknown	0 (0.0%)
Median age	42.5 yrs
Age range:	3-86 yrs
Gender	
Female	5 (62.5%)
Male	3 (37.5%)
Hospitalized	
Yes	2 (25.0%)
No	5 (62.5%)
Unknown	1 (12.5%)
Median no. of days hospitalized	2 dayys
Range of no. of days hospitalized	1-3 days
Outbreak status	
Outbreak/ cluster related	0 (0.0%)

Figure 15: Age Distribution of Cases of Shigellosis (N=8), Wyoming, 2008

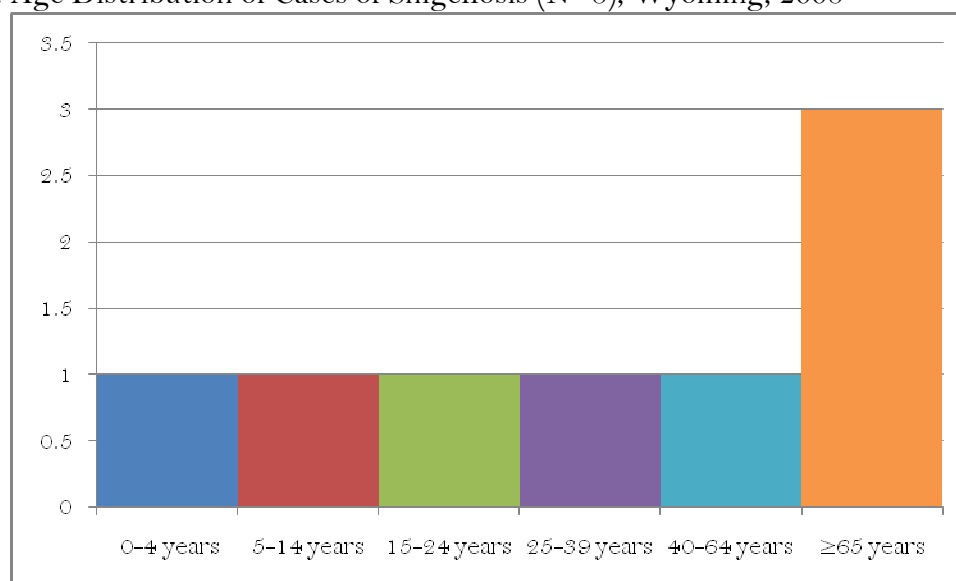


Table 48: Crude and Age-adjusted Incidence of Shigellosis by County, Wyoming, 2008

	Total No. of Cases	Crude incidence rate (per 100,000 per year)	Age-adjusted incidence rate (per 100,000 per year)	SIR* (95%CI)
Albany	0	0.00	0.00	—
Big Horn	0	0.00	0.00	—
Campbell	0	0.00	0.00	—
Carbon	2	12.80	10.34	5.87 (-2.27-14.01)
Converse	0	0.00	0.00	—
Crook	0	0.00	0.00	—
Fremont	2	5.25	5.70	3.24 (-1.25-7.73)
Goshen	0	0.00	0.00	—
Hot Springs	0	0.00	0.00	—
Johnson	0	0.00	0.00	—
Laramie	1	1.14	1.39	0.79 (-0.76-2.33)
Lincoln	0	0.00	0.00	—
Natrona	2	2.73	2.89	1.64 (-0.63-3.92)
Niobrara	0	0.00	0.00	—
Park	0	0.00	0.00	—
Platte	0	0.00	0.00	—
Sheridan	0	0.00	0.00	—
Sublette	0	0.00	0.00	—
Sweetwater	1	2.50	3.01	1.71 (-1.64-5.06)
Teton	1	4.54	8.54	4.85 (-4.66-14.36)
Uinta	0	0.00	0.00	—
Washakie	0	0.00	0.00	—
Weston	0	0.00	0.00	—
Total	8	1.76	1.75	0.27 (0.08-0.45)†§

*Wyoming state population used as “standard” population when calculating age-adjusted estimates for each county.

† SIR calculated using estimated national incidence rate of 6.59 cases per 100,000 per year.

§ Estimate is statistically different than the expected incidence rate. Estimates of greater than 1.00 indicate incidence is greater than what is expected and estimates less than 1.00 indicate incidence is less than what is expected and that these differences cannot be explained by differences in the age distribution of the population.

Table 49: Clinical Characteristics among Cases of Shigellosis, Wyoming, 2008

	Total, (%)
Had gastrointestinal symptoms	
Yes	6 (75.0%)
No	1 (12.5%)
Unknown	1 (12.5%)
Specimen source	
Stool	6 (75.0%)
Blood	0 (0.0%)
Urine	1 (12.5%)
Other	1 (12.5%)
Unknown	
Bacterial isolate was confirmed at WPHL*	
Yes	6 (75.0%)
No	2 (25.0%)

Species of <i>Shigella</i> (N=6)	
<i>S. sonnei</i>	6 (100.0%)
Received antibiotic	
Yes	4 (50.0%)
No	2 (25.0%)
Unknown	2 (25.0%)

* Wyoming state statute requires clinical laboratories to send confirmed *Salmonella* isolates to the Wyoming Public Health Laboratory for confirmation, subtyping and pulsed-field gel electrophoresis analysis.

Table 50: Most Likely Source of Infection among Cases of Shigellosis, Wyoming, 2008.

	Total, (%)
Person-to-person transmission	0 (0.0%)
No source evident	7 (87.5%)
Foreign travel	1 (12.5%)
Daycare transmission	0 (0.0%)
Occupational/laboratory exposure	0 (0.0%)

Likely exposures are determined by making a "best guess" by trained epidemiologists based on the case patient's exposure history and should not be viewed as a definitive source of infection.

Table 51: Frequency of Other Exposures among Cases of Shigellosis, Wyoming, 2008.

	Total
Ate at any restaurant	4 (50.0%)
Ate at any fast food restaurant	2 (25.0%)
Consumed water from a private well	1 (12.5%)
Swam in treated water venue	0 (0.0%)
Swam in untreated water venue	0 (0.0%)
Attended daycare	0 (0.0%)
Live with daycare attendee	0 (0.0%)
Out of state travel	4 (50.0%)
International travel	1 (12.5%)

Percentages can add up to more than 100% because case patients can report more than one of these exposures.

Table 52: Frequency of Reported High-Risk Occupations among Cases of Shigellosis, Wyoming, 2008.

	Total
Food-handling employee	1 (12.5%)
Healthcare worker with direct patient contact	0 (0.0%)
Daycare worker	0 (0.0%)

Public health guidelines call for the exclusion of these individuals from their high-risk occupational setting until the patient has provided two consecutively negative stool samples that were collected at least 24 hours apart and at least 72 hours after the cessation of antibiotic therapy.

Outbreaks of Shigellosis, 2008

The WDH Infectious Disease Epidemiology Program did not investigate any outbreaks of shigellosis in 2008.

Trichinellosis

Case definition

- Confirmed – a clinically compatible case that is laboratory-confirmed using at least one of the following methods:
 - Demonstration of *Trichinella* larvae in tissue obtained by muscle biopsy, or
 - Positive serologic test for *Trichinella*

Summary

In 2008, no cases of trichinellosis were reported to the WDH Infectious Disease Epidemiology Program (0.00 cases per 100,000 per year). The incidence of trichinellosis in Wyoming was statistically equivalent to the estimated US incidence (0.00 cases per 100,000 per year) based on CDC National Notifiable Disease Surveillance System.

Outbreaks of Trichinellosis

The WDH Infectious Disease Epidemiology Program did not investigate any outbreaks of trichinellosis in 2008.

Vibrio (cholera and non-cholera species)

Case definition

- *Vibrio cholerae* (Cholera)
 - Confirmed – isolation of toxigenic (cholera toxin-producing) *Vibrio cholerae* O1 or O139 from a clinical specimen
 - Probable – a clinically compatible symptomatic case that is epidemiologically-linked to a confirmed case
- Non cholera *Vibrio* species (Vibriosis)
 - Confirmed - isolate of *Vibrio* species other than toxigenic *Vibrio cholerae* O1 or O139 from a clinical specimen
 - Probable – a clinically compatible symptomatic case that is epidemiologically-linked to a confirmed case

Summary

In 2008, no cases of cholera or non-cholera vibriosis were reported to the WDH Infectious Disease Epidemiology Program (0.00 cases per 100,000 per year). The incidence of cholera in Wyoming was statistically equivalent to the estimated US incidence (0.00 cases per 100,000 per year) (SIR: incalculable), and the incidence of non-cholera vibriosis in Wyoming was also statistically equivalent to the estimated US incidence (0.18 cases per 100,000 per year).

Outbreaks of Cholera or Non-cholera Vibriosis

The WDH Infectious Disease Epidemiology Program did not investigate any outbreaks of cholera (*Vibrio cholerae*) or non-cholera vibriosis (*Vibrio species* other than *V. cholerae*) in 2008.

Yersiniosis

Case definition:

- Confirmed – isolation of *Yersinia* species from a clinical specimen
- Probable – a clinically compatible case that is epidemiologically-linked to a confirmed case

This disease is not nationally notifiable, and therefore the case definition is used in Wyoming for surveillance purposes.

Summary

In 2008, no cases of yersiniosis were reported to the WDH Infectious Disease Epidemiology Program (0.00 cases per 100,000 per year). The incidence of yersiniosis in Wyoming was statistically equivalent to the estimated US incidence (1.00 cases per 100,000 per year) (SIR: incalculable).

Outbreaks of Yersiniosis

The WDH Infectious Disease Epidemiology Program did not investigate any outbreaks of yersiniosis in Wyoming in 2008.

Summary of Other Enteric Disease Outbreaks Not Summarized Above

Outbreak of Norovirus Associated with Conference Center, Albany County, 2008

In April 2008, the WDH Infectious Disease Epidemiology Program was notified of reports of gastrointestinal illness associated with a conference held at a conference center/hotel in Albany County. A group of 117 persons attended various days of the conference, and 15 were reported to be ill. An outbreak investigation was initiated that day by the WDH Infectious Disease Epidemiology Program and City of Laramie officials. Active surveillance revealed similar gastrointestinal illness in another separate group holding a banquet at the facility on a subsequent day. A total of six people were reportedly ill from that group. Illness was characterized by diarrhea, nausea, vomiting, and stomach cramping. Median duration of illness was 48 hours and is consistent with norovirus. Two stool specimens taken from ill patrons confirmed norovirus genogroup II as the etiology of the illness. The investigation identified several food items served at breakfast, lunch, and dinner buffets to be associated with illness. Employee interviews revealed at least 3 food-handling employees with gastrointestinal illness prior to and during the first group's banquets. One patron also reported illness prior to attending the conference. Norovirus was most likely spread through environmental contamination by ill employees and possibly ill patrons. No additional illnesses were identified in groups holding events at the conference center after April 12, 2008.

Outbreak of Gastrointestinal Illness among Participants of Rotary Conference, Park County, 2008

In June 2008, the WDH Infectious Disease Epidemiology Program was notified of 50-60 reported illnesses after a Rotary conference held in Cody, Wyoming. Three local caterers provided foods and beverages for various events associated with the conference. An outbreak investigation was initiated by the WDH Infectious Disease Epidemiology Program and the Wyoming Department of Agriculture Consumer Health Services Division. The investigation identified 41 persons who met the case definition for gastroenteritis (diarrhea of 3 or more loose stools in 24 hour period lasting at least 6 hours in duration). The etiology of the outbreak was not confirmed through laboratory methods. Illness was characterized by diarrhea with no vomiting or fever. Median incubation period was 12.5 hours, and median duration of illness was 37 hours. Epidemiologic data suggested that several foods served at a BBQ dinner provided by one local caterer were associated with illness. The illness was suspected of being a toxin-mediated illness based on illness characteristics. Foods and beverages served at the conference were prepared off-site and were transported to the conference venue. Investigators suspect that temperature abuse of foods by the one caterer was responsible for the toxin-mediated illness. Environmental health investigations identified problems with temperature control upon kitchen inspection of the one caterer that prepared food for the Friday night BBQ. Prevention measures were implemented with the caterer associated with participants' illnesses.

Possible Cluster of Gastrointestinal Illness Associated with a Detention Center, Campbell County, 2008

In June 2008, the WDH Infectious Disease Epidemiology Program received a report from a detention center in Campbell County stating that 20-30 inmates had experienced a gastrointestinal illness. Follow-up with facility confirmed that as many as 30 inmates were reporting illness, but no symptoms were physically observed by detention center medical staff. The medical supervisor suspected that some illnesses were real and some may have been feigned. The medical supervisor also suspected that the illness was foodborne in nature, and kitchen staff report some potential breaks in food safety. A consumer health specialist

followed-up with the facility by conducting a full kitchen inspection. Some violations in the Wyoming Food Safety Rule were noted and were corrected.

Outbreak of Norovirus Genogroup II at Guest Ranch, Teton County, 2008

In August 2008, the WDH Infectious Disease Epidemiology Program was notified by Teton County Public Health of a cluster of norovirus-like illnesses at a guest ranch in rural Teton County. Investigation revealed that a housekeeping staff member had brought her ill son to work the previous week. The ill child, one ill employee, and two ill guests were confirmed with norovirus genogroup II infection at WPHL. Water tests did not suggest a problem with the ranch's drinking water system. Investigators suspected that person-to-person transmission was responsible for the spread of the infection from staff members to guests. All staff members assisted with food preparation and/or food service, and staff members attended the same meals with the guests. Teton County Public Health provided the ranch with guidance on disinfection and food safety.

Outbreak of Norovirus Genogroup II Among Travelers of a National Park Bus Tour, Teton County, 2008

In October 2008, the WDH Infectious Disease Epidemiology Program was notified by National Park Service officials of a group of 12 travelers from the same bus tour presenting to the Old Faithful Clinic with symptoms of viral gastroenteritis. The bus tour had commenced in Kalispell, Montana and was on its way to Jackson, Wyoming that day. Public health officials were able to collect stool specimens on two ill travelers. Both travelers were positive for norovirus genogroup II at the Wyoming Public Health Laboratory. Teton County Public Health provided education to travelers and to the hotel in Jackson set to receive them to help prevent further transmission. A point source was not identified. The National Park Service disease surveillance system did not identify any other concurrent outbreaks among park staff or guests.

Outbreak of Gastroenteritis Among Holiday Party Attendees, Natrona County, 2008

In December 2008, the WDH Infectious Disease Epidemiology Program was notified of a suspected cluster of illness among coworkers and their guests who attended a catered holiday party at a local Natrona County restaurant. Sixteen individuals reported mild gastrointestinal illness. The median incubation period was 13 hours and the median duration of illness was 37 hours. Attempts were made to acquire laboratory specimens for testing, but no ill patrons provided stool samples. Crude epidemiologic analyses suggested that a prime rib roast may have been associated with illness. The Casper Natrona County Health Department assessed food preparation practices and advised the restaurant on proper food-handling. No additional illnesses related to the venue were identified.

Outbreak of Norovirus Among Coworkers, Natrona County, 2008

The WDH Infectious Disease Epidemiology Program was notified in December 2008 of a cluster of gastrointestinal illness among coworkers who had consumed a breakfast meal from Restaurant A and a lunch meal from Restaurant B. The WDH Infectious Disease Epidemiology Program and the Casper Natrona County Health Department cooperatively investigated the cluster. A total of 10 individuals who attended the Business A's holiday party were ill with gastroenteritis after eating the breakfast served by Restaurant A, and/or lunch served by Restaurant B. Norovirus genogroup II was identified in the stool of two case

patients at WPHL. Statistical analyses revealed no food items or other exposures were associated with illness. One employee of Business A reported illness onset before the office party, and that employee's symptoms were consistent with norovirus infection. The timing of illness onset and illness duration do not suggest a point source exposure consistent with consumption of breakfast or lunch at Business A. No employees or additional patrons of the Restaurant B reported being ill. Given the analysis above and the contagiousness of norovirus, the most likely source of illness was the presence of recently ill persons (visitors and/or other employees) within the Business A setting. Norovirus is highly contagious, can be easily spread from person to person and can be shed up to 48 hours after a person's last episode of vomiting or diarrhea. The investigators believe the gastrointestinal illnesses at Business A did not originate from consumption of food from Restaurant A or B. Norovirus education materials were provided for the business and restaurants involved in this outbreak.

For more information about infectious diseases in Wyoming, please contact our program at:

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References:

Centers for Disease Control and Prevention. National Notifiable Diseases Surveillance System Case Definitions found at: <http://www.cdc.gov/ncphi/diss/nndss/PHS/infdis.htm>.

Centers for Disease Control. *Multistate Outbreak of Salmonella Infections Associated with Peanut Butter and Peanut Butter-Containing Products – United States, 2008-2009*. MMWR 2009;58(4):85-90. Available online at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5804a4.htm>.